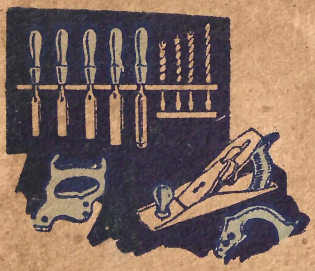

"HOW TO DO IT"

No. 2

Contents :

Workshop Equipment
Boot Repairing
Soldering and Metal Work
Damp Walls and their Treatment
Cement & Concrete
Special Section on "HOW TO DO IT" *for* "HANDYMEN"

2/-

A "DOMUS" BOOK *for* "HANDYMEN"

Contents

FOREWORD

one of the greatest assets in life is——————"KNOWING HOW"

HERE are many men and women who would willingly tackle all sorts of jobs around the home but for the fact that they do not know how to set about them. There is a very good story told of an old lady in an English village who had a lot of trouble with the water pump. After having two local tradesmen who each charged her 10/- for the work they put in on the pump, it was still non-operative. In desperation the old lady called in another man, who, after correcting the trouble satisfactorily, sent her an account for £2/2/-. The old lady was very peeved, and told him that on two occasions she had had other workmen to attend to the pump who charged only 10/-. "Yes," said the expert, "so you did, but my fee is 'For knowing how.'" There is a lot of truth in that story. The value of knowing how saves many pounds in actual money and builds up a big credit balance in knowledge.

This is the second "Wartime Handyman's Book," and in it readers will find further information as to HOW certain jobs should be done, the correct use of workshop equipment, and, what is very important, a special section for the women of the home who, in these days of lack of manpower, have themselves to do so much of the repair work and other jobs.

Special stress has been laid on the use of certain tools and why they should be used only for certain work. The standpoint of economy has also been dealt with in full, and it will be seen how much can be saved by careful attention to detail and lack of waste. In nine cases out of ten it is not the *inability* to do certain jobs, but the lack of "knowing how."

Every subject dealt with in these and all other "DOMUS" publications is explained in such a way that it is impossible to do wrong if the instructions are carefully followed.

Readers are invited to write to the editor on any matter with which they are not familiar. In this way they will feel that they have at their disposal as much help as they may need to build up knowledge and experience, at the same time helping themselves to maximum economy in all matters connected with the rehabilitation of the home — from the building of toys for the children to the addition of an extra room on the main dwelling. For any enquiries readers are asked to write to the Editor, 100 Queen St., Melbourne, Box 2323V, G.P.O., Melbourne, C.1.

"Domus"

Chapter I.

WORKSHOP EQUIPMENT

HOW TO RECOGNISE VARIOUS TOOLS THEIR USES

GENERAL HINTS

THERE are many handymen (and women) who wish to purchase odd pieces of equipment for the workshop but do not know just what to ask for. They are aware that there are certain tools for specific jobs, but the names of such tools and the particular purposes they will serve is quite a mystery. Likewise, when they go to a shop to buy tools they do not know the appearance of them, neither do they realise the difference in shape or construction in a certain range of, say, chisels, all of which may be suitable for certain purposes but not for ALL types of work.

In this first chapter of this new Handyman's Book special trouble has been taken to not only explain the various pieces of equipment, but to SHOW their characteristics by illustrating them in detail.

Thus, in the range of VYCES, it will be noticed that four of them are shown; they are ALL vyces, but none of them is used for the same purpose.

This does not mean that you MUST have ALL the list of tools shown in this chapter. It does mean that you can KNOW what you want for certain work. As an example, you may want a vyce for the bench for general work; in that case you do NOT want to buy one similar to No. 4, which is purely for sharpening saws.

It is points like these which are actually KNOWLEDGE. After careful study of these illustrations it will be possible for the merest novice to go into an ironmonger's and ask for the correct article, KNOWING that they will get a tool which will do the work required.

In order to make this a fully informative chapter, it will be noticed that each illustration is numbered. These numbers will be dealt with individually, with remarks relative to their use, general construction, and whether they are essential to the average handyman, or whether it is possible to still "carry on" without them for the time being.

One point is fully recognised by the writer, and that is the difficulty in obtaining tools of various sorts. In the past "Domus" has stressed the advantage of visiting good second-hand shops. Many of these shops deal in all classes of wood-working and other tools. Some of them may not be worth

buying; others need only a good doing up, and they are better, in some cases, than new articles. Saws, for instance, are often obtainable in good makes but NOT in good condition. Such a saw, unless it is really badly twisted and knocked about, will probably sharpen and reset so well that it will be at least as good as new.

In buying such equipment from shops which deal in second-hand tools, it is necessary to make a careful inspection of such articles as a brace, a vyce, cramps, etc. These tools have all got "wearing parts"; that is to say, you will find threads and screws and similar parts worn. If they are worn badly it is a very uncertain "bargain." In the case of chisels and similar tools, however, it will be safe, under most circumstances, to go ahead and secure them in this manner.

Wherever possible in these remarks it will be indicated whether it is advisable to buy the various tools from a second-hand source. Thus readers will get a fair insight into the main points to remember when they are looking for their equipment. Such information will also be very valuable to women "handymen" of the home. It is nice to know just what you want, the name of it, and its purpose in craftsmanship.

The first list of tools is introduced in the first page of illustrations. These, as will be generally recognised, are CHISELS. Take them from the top of the page and read downwards. No. 1 is the ordinary type of FIRMER CHISEL. A stout, fairly short blade fitted INTO the handle.

The next illustration is that of a BEVELLED CHISEL. It can be clearly seen from whence this tool gets its name; it is bevelled, of a lighter type than the standard "firmer"; it is also slightly longer in the blade and much thinner in its through section than the firmer chisel. It also ENTERS the handle.

No. 3 on the list is one which deserves more attention than it normally gets. It is a SOCKET FIRMER. It is seen that its construction is much more solid than that of other chisels; its steel portion is much longer owing to its socket, thus making the handle shorter and "stockier"; it is used for heavy work where strength is demanded.

No. 4 is also a socket, but a BEVELLED socket, and is in the same relative position to No. 3 as is No. 2 to No. 1.

Nos. 5 and 6 are respectively FIRMER and FIRMER SOCKET fitted with a ferrule top to the handles. They are the heavier sized chisels, which, as can easily be seen, will be submitted to far heavier work, and therefore will have much greater "knocks" with the mallet. To resist this heavier service they are reinforced with the steel top ferrule.

No. 7, the last sketch, shows a GOUGE chisel, in other words a "part round" chisel. No workshop should be without one of these. A ¾-inch size is very handy and will do work which it is impossible to tackle with an ordinary square-bladed tool.

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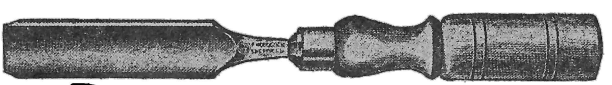

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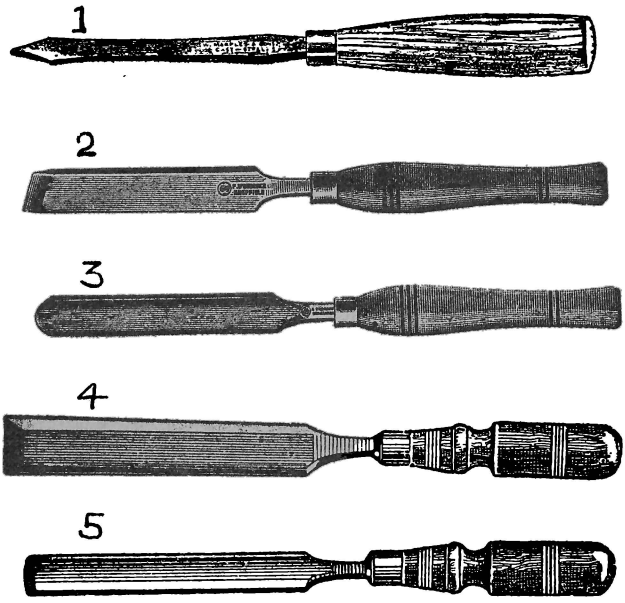
Passing on to the next page of illustrations we have a few chisels of a different type altogether. They are wood turning tools and their shape is interesting. As an outstanding example take No. 2. Note the "off straight" blade, so ground that when you stand in the correct position in front of a rapidly revolving lathe the blade of the chisel approaches the work "square on." No. 1 is the spear-pointed chisel. No. 3 a deep-bladed gouge, with a shallower gouge illustrated by No. 5. No. 4 is bevelled but of a totally different shape from the standard bevelled chisel discussed earlier. Note particularly the angles to which the blade edges are ground. By visualising the work to be done on a lathe and the position you would take up to do the work, it is quite easy to follow the REASON for the angles mentioned. Much could be said on the subject of wood-turning, and it will be dealt with completely in a later book.



We pass now to the matter of files. These are often to be bought second-hand, but are just as often NOT SO GOOD. If toying with the idea of buying in this way, it is necessary to inspect them carefully to see if they are too far worn down to have any "cutting face" left. Often such files are quite filled up with fine particles of metal, and have no "bite" left at all; in such a case you are better without them.

GROSSING OR FISHBACK FILES
Bastard Cut

SQUARE

ROUND

HALF ROUND

FLAT

HAND PARALLEL WITH ONE SAFE EDGE

TAPER SAW FILES

CABINET RASP

Taken in their due order as illustrated, we have the HALF-ROUND file; this is most usual and a very practical file for many purposes.

No. 2 is the completely square file; this is a most useful shape, and, although not so easy to obtain now, is one which should be added to the list as soon as available.

No. 3 illustrates the round or RAT-TAIL file. Probably no shape earns its keep better than this file. After drilling holes in metal it is the most handy file for finishing and cleaning off edges, and also for final fitting of bolts or rivets.

No. 4 is the half-round. Similar in shape to the first file illustrated, it has a finer cut. No. 1 is really known as Bastard Cut, which is a much coarser "grain" than the standard half-round (No. 4).

No. 5 is the flat file. One edge on these files is plain; that is to say, it is not made with a filing cut and is known as "safe edge."

No. 6, which is also a flat file, is a PARALLEL type; it has no taper towards the front end. It also has a plain or "safe" edge." As a matter of fact, it, more so than the tapered flat file, has the characteristic of this "safe" edge.

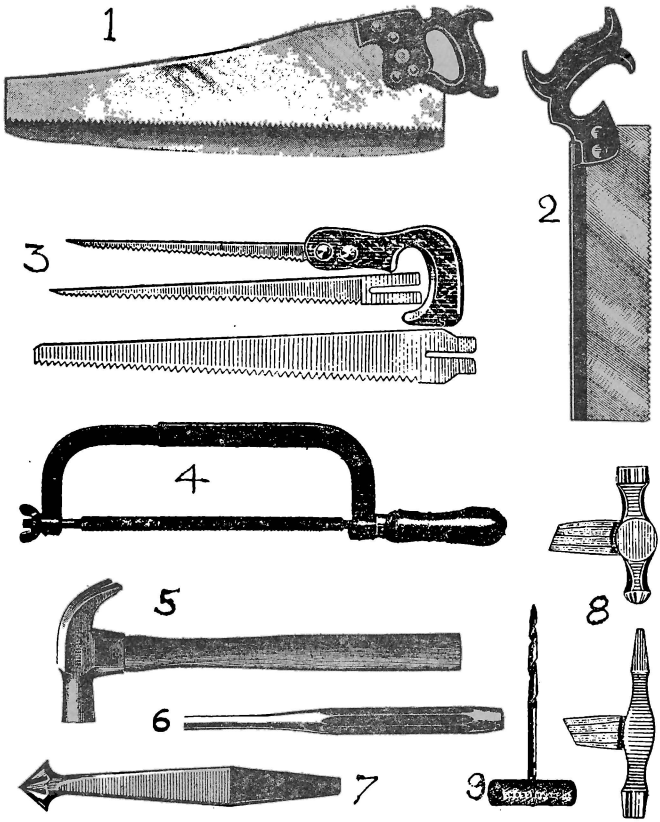
No. 7 illustrates the Taper Saw file. As its name implies, it is made for SAW SHARPENING, thus its shape. In addition to that purpose, however, it is most useful for other work. Nevertheless, if one sharpens his own saws, it is most advisable to keep a set of these files SPECIFICALLY for that work. By so doing you will always have a file in good fettle for the saw "doctoring," otherwise it is often found that when you want a good sharp file for saw sharpening you have used it for other work and it has become filled up and lost its cutting propensities.

No. 8 is the cabinet RASP and is not suitable for any work but rough wood rasping. It can be used with benefit as a boot rasp, however. . Actually a boot rasp is accommodated with two or more grades of "cut," one about the same roughness as the wood rasp, while the other section is devoted to a slightly smoother surface for finishing.

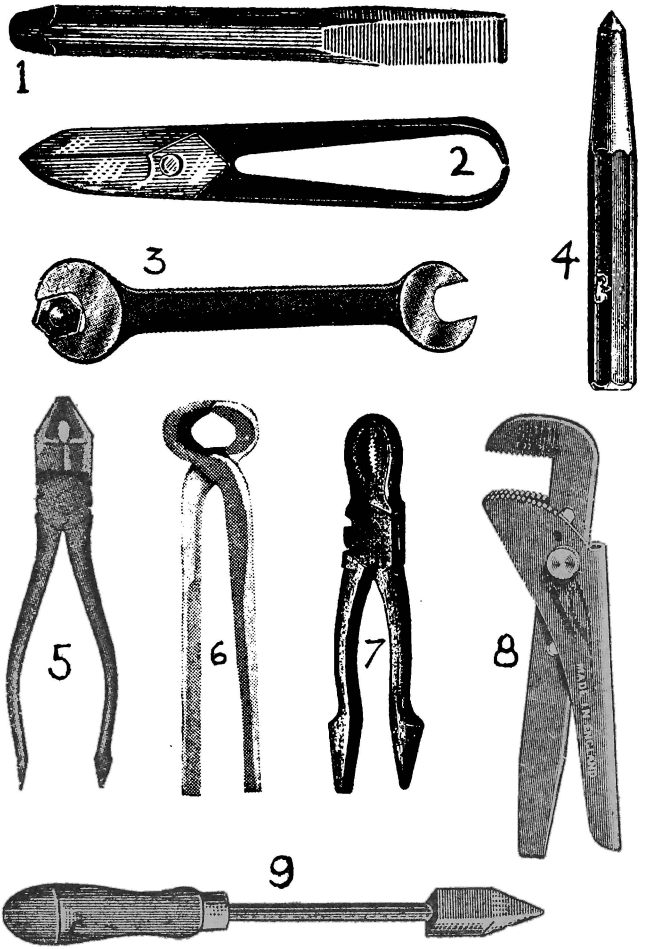
Further comments on the particular use of the various files will appear in a later part of this chapter.

The next page of illustrations will give a good insight into the various types of saws. No. 1 is the standard handsaw. It differs in detail only as far as the number of teeth are concerned. This is also dealt with in the latter part of this chapter. The No. 2 model is the Tenon saw; while No. 3 illustrates a set or "NEST" of three different saws, the handle of which is a separate unit, enabling the handyman to fit the particular blade required for any specific job. In No. 4 we have the HACKSAW. This is used solely for cutting metal, and, although there may be emergency occasions when you are forced to use it to cut a small piece of timber, it is not suitable

for that work. Its teeth are cut very closely together, and are much less deeply cut than in a timber saw; thus they will fill up with sawdust. Such a saw is in every way intended ONLY for metal; the steel blades are of hardened metal and very brittle.



No. 5 brings us to the claw hammer. Suffice it to say that such a hammer should be of decent quality. The claw portion in a good hammer will "pull" a thin nail which has LOST ITS HEAD. This is due to the fact that a perfectly finished hammer of this type has been so well cut and balanced that the inner portion of the claw is accurately ground out to a pin point "V"; that is why it pays you to buy a hammer of quality. In addition, you will find a good hammer is well "balanced" and has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just the correct weight, well distributed, with a "FACE" so well finished that "slipping off" the head of a nail is almost impossible if the stroke is true.

No. 6 is an illustration of an ordinary nail punch. One of these is essential in the tool kit. They are made in various sizes, graded from about ⅛ in. to ¼ in. No. 7 is the COUNTERSINK BIT. This is invaluable for countersinking for screw heads and similar work. Economy can be observed by buying a half-inch countersink bit; thus if you need the full size for large screws you have it. On the other hand, you need only "drill into" timber for half the distance and you have the much smaller size. No. 9 is the Gimlet, a most useful tool for drilling small holes, being fitted as it is with a handle. The "bit" portion being short you are able to FEEL the work as it progresses. Most useful for light, thin timber. Sizes vary from ⅛ in. to 5/16 in.

The remaining illustration, No. 8, is of two different hammers. The top is a type of engineer's hammer, with the two faces flat and round. The second drawing shows a light type of cabinet hammer, with the flat end which is so useful for flat edges where nails must be driven right into a corner or bead edge.

The following page of drawings is fairly simple in explanation. No. 1 is the cold chisel (not COAL chisel). Sizes and lengths vary. Used for metal cutting, the breaking up of stone, concrete and for taking out holes before plugging walls, etc. These are made in specially long lengths for work which demands depth, and many sizes suitable for general work.

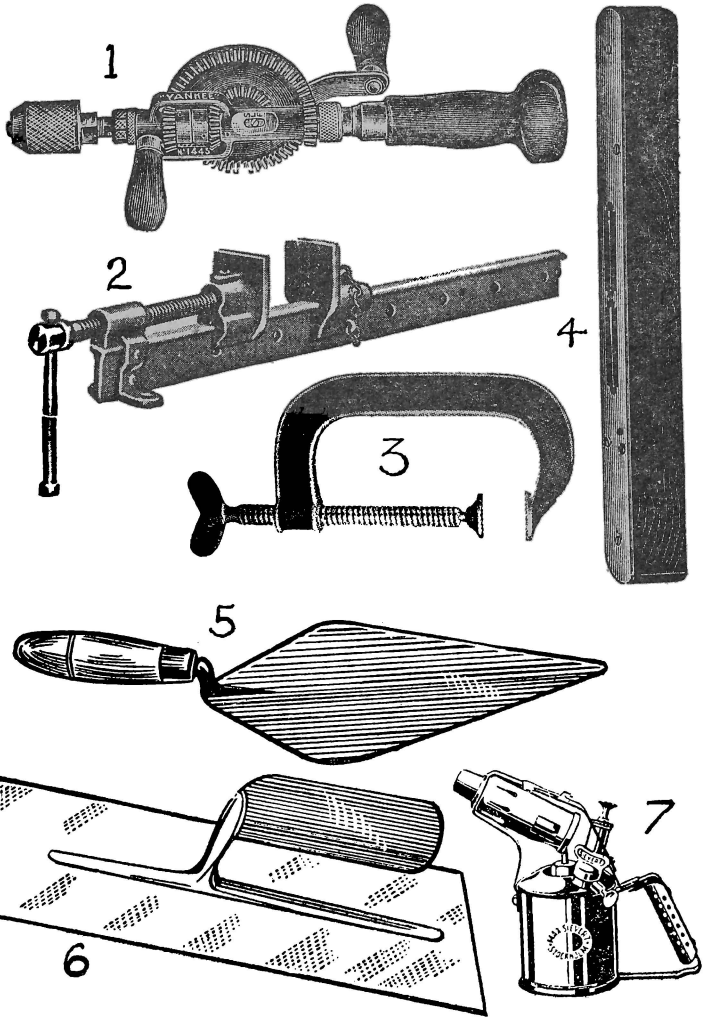
Next are the TINMAN'S Snips. These are for cutting sheet metal, and are likewise obtainable in several sizes. A good standard size for the home craftsman is 8 in. No. 3 is an ordinary SPANNER. Hundreds of different sizes and types are made . . . they are all spanners.

No. 4 is the centre punch and is very handy for the specific work for which it is made, that of punching "at the centre." Note that its working end is POINTED and NOT flat, as is the nail punch.

Nos. 5, 6, 7 and 8 are all PLIERS of various sorts. The first is a plain SQUARE-NOSED plier; the next is the true type of PINCERS. Following them we have the round-nosed "GAS" pliers, as they were termed in the days when a plumber found them one of the most useful tools in his kit. They are provided (as are the square-nosed) with side cutters for wiring cutting. No. 8 is the well known adjustable grips and probably the most useful all round job you can buy; they are obtainable from 4 in. up to 18 in. sizes.

Now for the next list. We start with the hand drill. These are most useful, but NOT essential. One can use the brace if a hand drill is not available. Being geared, they will transmit considerably more speed than you can get from an ordinary hand brace.

No. 2 is the BAR CLAMP or CRAMP, used for table tops and all similar work which must be cramped after glueing. A pair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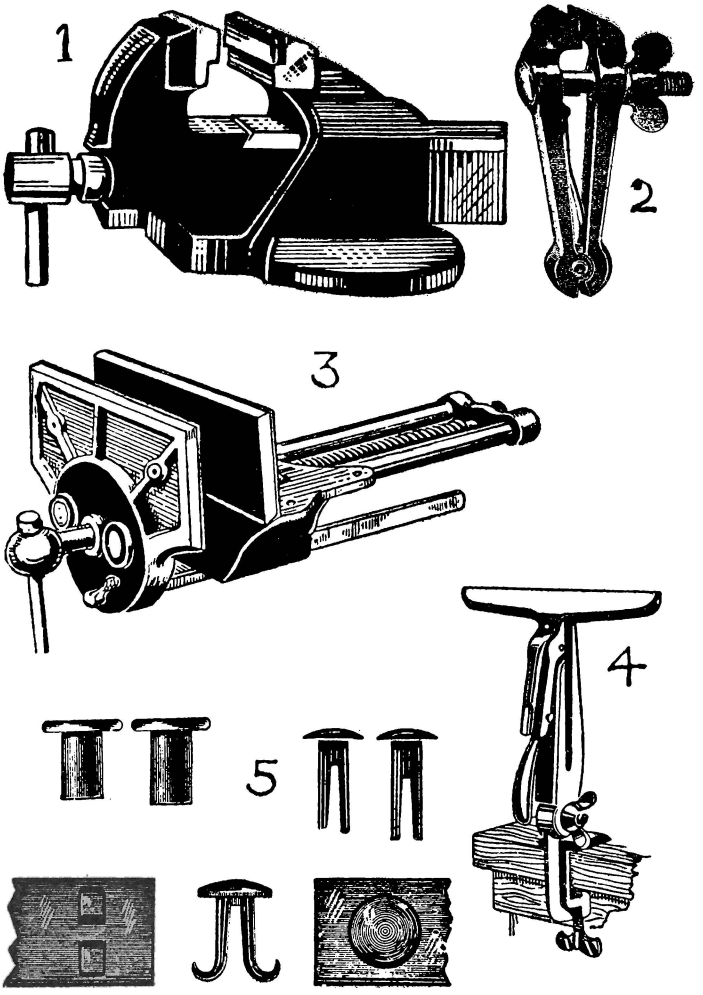
of these is essential if you have much wide, flat board work to handle. No. 3 is the "G" cramp; these are made in varying sizes from 4 in. (and even smaller) up to 12 in. and 14 in., invaluable for small cramping jobs of limited width. No. 4 is a spirit level, not an essential tool for the man just starting, but very handy to add to your list as you get on. Actually this could be described as an INSTRUMENT. It is used for ascertaining a true LEVEL, and is provided with a tube of liquid accurately set in the wooden base. As you lay the level on top of a piece of timber, a fence rail, or brickwork, etc., you can see accurately by the "set" of the liquid in the tube as to whether your work is "level." No. 5 is the pointing trowel, and needs no further remarks other than to show you what to ask for. The other trowel is known as a plasterer's trowel or float. This is not very much in the handyman's line, unless he is a tradesman, but it is handy to be able to recognise the tool. No. 7 completes the list on this page with the illustration of a blowlamp. These are used for burning off paintwork, for the heating of soldering irons, and quite a few other jobs that will suggest themselves to you if you possess a lamp. They are worked under pressure, and generate a great heat. Most economical in use.

Next we have a most interesting and instructive page of drawings. No. 1 is the standard VYCE. Fixed to your bench it provides a HOLD for all sorts of jobs. It is hard to do without such a tool in the modern workshop. Sizes vary . A good size for general work is 3 in.; this refers to the LENGTH from side to side of the jaws, NOT THE WIDTH THEY WILL OPEN.

No. 2 is a small hand-vyce, most useful for holding small objects when you want more freedom of movement than the large vyce will give you. You can "get at" a piece of work so held.

No. 3 is the BENCH VYCE for CARPENTRY work. It is the vice which holds timber for plane work, and you must have this equipment if you are to successfully handle your carpentry work. It need not be the model illustrated. You will have seen the old type of WOODEN bench vyce, with long wooden front panel, and excellent jobs they were, too. Get one if you have the opportunity. These have sometimes been described in wide terms a bench "screw."

No. 4 is a vyce for a specific purpose. It is a saw sharpening and setting vyce. Note that it has an additional clamp to fix to bench, also that its jaws are longer by far than for normal vyce work; also that these jaws are lighter in structure and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of quite different patterns from other jobs. This tool gives a long length of "grip" on the saw blade. No. 5 fills in the page and is interesting insofar as it shows two different types of rivets. The two at the left-hand side are ordinary solid rivets, generally of plain or galvanised iron. Those on the left are the BIFURCATED (or SPLIT) rivets. The lower illustrations show the effectiveness of their grip. They are not suitable for rivetting sheets of metal together; ideal, however, for leather and similar materials where they can bend over and fasten their teeth in on the reverse side.

The final page of illustrations gives some idea of quite a range of tools which are all in the carpenter's list. No. 1 illustrates the JACK PLANE. A try plane is of similar shape but much longer, heavier and wider. No. 2 is the wooden smoothing plane, while No. 3 shows the steel jack plane. The latter is also made as a smoothing plane. No. 4 is a spokes-shave, one of the handiest little "smoothing" tools in the work-shop.

These are also obtainable in both wood and metal. No. 5 is known to all of us, it is a BRACE. These braces are made in a PLAIN type or with a RATCHET. The latter allows work in congested corners where it is impossible to obtain a full "sweep." The ratchet fixing is set to allow you to take a half or quarter turn and so progress slower but effectively. The ratchet control is set in "reverse" when withdrawing the brace.

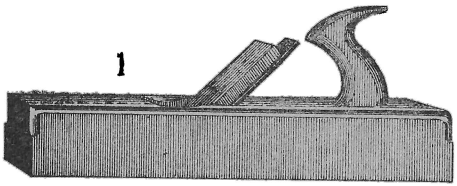
No. 6 needs but little introduction — just a plain screwdriver. The one illustrated has a long blade. They are made from very small sizes up to as long as 18 in., with both short and long blades. Several of these are to be recommended in order to cope with all types of work. They are not expensive, and should last for many years with due care.

No. 7. Here we have a TRY SQUARE. Note that it is made with a bevel set at the angle point. Buy one of this type if possible; it gives you correct degree for cutting mitres. If you do not have a mitre box, or if you are away from it when you do a job which necessitates cutting a mitre, a 9 in. set square is the smallest for practical all round use.

No. 8 may be described as a similar type of tool to the square. It is made specially for setting correct angles. Note that it is fully adjustable. You may have a number of pieces of timber to be cut at the same angle. You set the bevel square to that angle and all the pieces MUST be the same.

Nos. 9 and 10 are respectively the MORTICE GAUGE and the ordinary marking gauge. The former is set for the marking of TWO LINES when cutting mortices in frames, etc. You KNOW that all the mortices must be the same width because you have set the gauge and marked the timber with it for the same width.

The marking gauge, on the other hand, makes but one mark (or scratch) on the timber. Thus, if you have a 1½ in. board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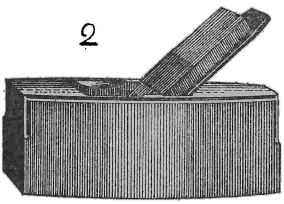
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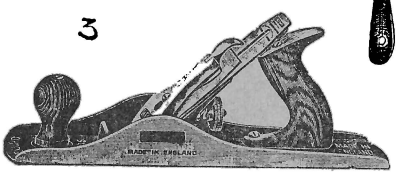
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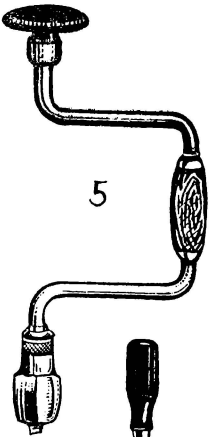
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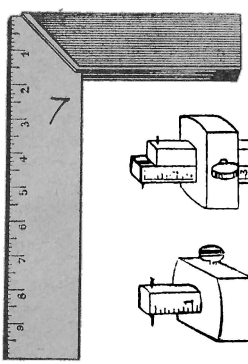
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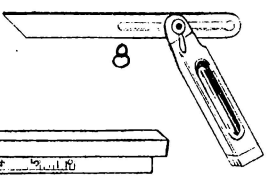
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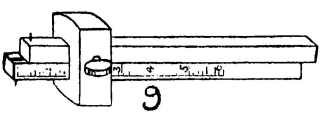
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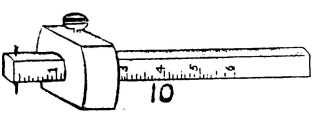
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with one side very out of square and are about to plane it down to an equal thickness, you set your gauge and run it down the surface of the board with the pin just touching the timber. The mark it leaves will give you the working line down to which you will plane, or, in the case of a big discrepancy, down to which you will saw.

No. 11 illustrates a standard wood twist bit. These are obtainable in a whole range from ¼ in. up to 1 in., and for special purposes even larger.

No. 12 is just to show what a BRADAWL is like. This is most useful, and can be bought for a few pence. The little blade is flat like a screwdriver, and made in two or three sizes. It is for boring holes in light timber or similar work.

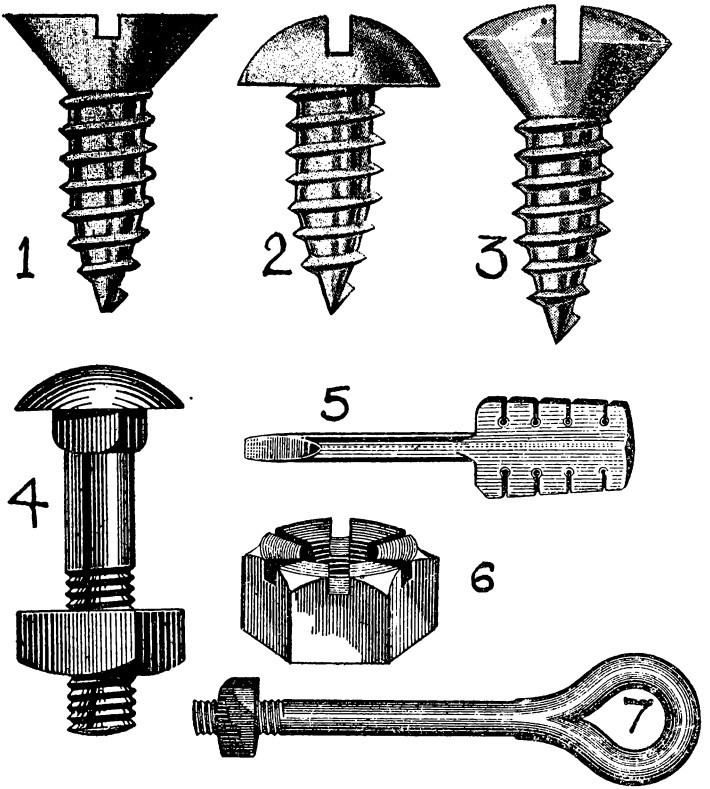
Our next page of illustrations is designed to give information on a few points which are not clear to everybody. Nos. 1, 2 and 3 are drawings of various types. The first shows the standard countersunk screw. No. 2 is the round-headed screw with a flat underside. No. 3 is a countersunk round or part round-headed screw. You will know what to ask for when buying screws if you keep these illustrations in mind.

No. 4 is the standard nut and bolt, made in all sizes from 1 in. by a ¼ in. up to a very long and thick bolt. You can get a huge range suitable for every purpose. There are, in addition to these, a big range of other types of nuts and bolts made in special shapes and sizes to suit specific jobs.

No. 5 is an illustration of a SAW SET. As can be seen, this little tool has cuts down each side. These cuts are of varying width. This is in order that they will fit various thicknesses of saw blades; for instance, you would use a CLOSER CUT for the thin steel teeth of a tenon saw, whereas for the big rip or hand saws the wider opening in the saw set would be necessary. The operation of this little tool is, of course, to fit over each tooth and allow you to "bend" or set that tooth to the required angle. No. 6 shows a nut which is grooved or castleated"; it allows you to use a bolt which has a small hole drilled right through it. Thus you can fix the nut against all fear of being turned off by means of a split pin or other wire fixing.

No. 7 completes the list, and shows a very handy little object known as an eye bolt. These are supplied in many sizes, and if unobtainable, the average blacksmith will knock you up a couple. Most useful for attaching to overhead beams to take a swing or to support any similar type of weight. You can use these for going right through a wall; place a larger washer or plate at the nut end to take the stress, and you have a most useful article.

In preparing this chapter, the Editor has taken particular care to set out the list of tools in such a manner that they will be easily recognised by the layman. Apart from the advantages of knowing what to ask for when purchasing tools, it is even more imperative that the handyman should know the uses of various tools.



Here is a little hint for the handy woman: "Don't borrow hubby's tenon saw to cut the meat bone." Nothing takes the teeth off such a saw quicker than a bone. There is one saw which can be used for this type of work with perfect safety, and that is the hack saw. This useful article is illustrated among the group of saws, and a glance will show that it is entirely different from a light, flat, steel saw. It has a blade of particularly hard steel, which blade is removable and can be replaced with a new one, and as the hack saw blade is made with the specific intention of cutting metal, it is obvious that a meat bone will not damage it. If you break the blade, the cost is only a few pence to replace it. A further point: Don't use a tenon saw (No. 2 illustration) for anything but fine cutting work. If, for instance, it is used as a hand saw on large, heavy timber, the thin steel blade

must become bent; however, even with the utmost care, there are occasions when the tenon saw-blade will develop a twist or warp." Under normal conditions, this trouble may be corrected by the following method:—

Place the saw with teeth of blade resting on the bench or piece of hardwood; then with a hammer give the top of the steel back a sharp blow near the front end, a similar blow in the middle, and a final one nearer to the handle. This should result in the straightening of the blade, because when such a saw is manufactured the steel blade portion is actually hollow to a slight degree, allowing the top free where it fits into the steel back. The reason for this shape is to ensure the blade being very taut; therefore, when the blade is forced under pressure into the steel back, such pressure straightens it and actually "pulls" the steel into the dead straight, flat sheet. Thus the hammering described above invariably brings the blade back to normal. If the damage is more severe, the saw must be attended to by an expert.

The tenon saw and its very small brother, which is known as the dove-tail saw, are used only for comparatively small cutting jobs where accuracy is essential. This applies particularly to the dove-tail. This tool is only about 8 inches

long, of steel, which is probably no thicker than that used in a coping saw blade. It is obvious that such fine steel must not be used for coarse work. As a matter of fact, the rule applying to cutting dove-tails (see No. 1 Handyman's Book) is that the dove-tail should fit straight from the saw, mainly because it is almost impossible to trim dove-tailed work. The tenon saw proper, which as stated is a large type of the dove-tail saw, is used for such jobs as cutting of tenons and similar small sections of timber.

The panel saw is actually a small size in hand saws. It is shorter in the blade and finer in teeth. For cutting shapes and removing under portions from flat boards, etc., we would select the group of saws illustrated as No. 3. Here you see three different sizes in blades, all of which will fit the one handle. This set of blades correctly used will cover a multitude of jobs. Here again care must be taken that they are not used as hand saws, the shape of the blades, particularly the two small sizes, being such that too great a strain must tend to bend and twist, and when such takes place with these blades, there is not sufficient material to allow of really satisfactory correction.

The final point of saws is the mention of the difference between a hand saw and a rip saw. Actually, of course, they are both hand saws, but the rip pattern, as its name indicates, is used for ripping down long and fairly heavy lengths of timber. If the handyman follows this first action of ripping heavy timber with a coarse teethed saw, he will come to this logical conclusion—he will notice that as he reduces the size of timber, so he is using a lighter weight saw for almost every operation. To make an exaggerated point of this, you would not attempt to saw a length of 3 ft. x 2 ft. hardwood with a tenon saw. This may sound absurd, but the writer has actually seen it attempted.

Now for a few words on files and their uses. Even as we use certain chisels, saws, and bits for certain specific jobs, so we shall find that by the selection of the correct file the job itself is more easily done, and the wear and tear on the tool is minimised. In the case of circular work on metal, you must use either a half round or completely round file. As in the case of saws, the coarser the work the rougher must be the cut of the file. A very rough file will only tear the edges of fine metal and give no good results, whereas by using a fine cut file you actually do get the good finish. Files are made for this purpose, and the material in them, as in all cases (if you select the right one), are of a harder type than the metal on which it is used. One of the most useful ranges of tools in the workshop is that of at least a half dozen files as follows:—

2 Taper saw files—one 6-in., one 8-in. These are mainly used for sharpening the saw, thus the shape.
1 good half-round file, medium cut.
At least 1 round or rat-tail file; and a good flat parallel.

Note in the illustrations the wood-rasp. This is very similar to a boot rasp, and can be used for that purpose without detriment. It is not suitable for any form of metal work, but is invaluable for taking off the "rough" on wood work.

Now glance at the group of illustrations showing two cramps. No. 2 illustrates what is termed a bar cramp. It can be seen quite clearly that it is adjustable up to quite a good width, these cramps being obtainable up to 5 or even 6 feet in length. They are used in pairs, for cramping wide boards together after glueing. Note the difference between No. 2 and No. 3, the latter being known as the "G" cramp. It is a most useful tool, and can be used singly or with as many additional cramps, as may be desired. It makes an excellent holding cramp and will easily grip a number of boards placed flat together when making measurements or similar adjustments. The handyman needs at least a pair of these.

Just one or two further notes on vyces. The group illustrated covers the necessary range, and here again it can be easily seen that one type or vyce is not suitable for work other than that for which it is intended. No. 1, even in a very large size, would have a jaw LENGTH of no more than 6 inches, with an open width of approximately 4 or 5 inches; such would be a large vyce. Keeping this fact in mind, and then realising that No. 3, which is a carpenter's bench vyce, has large jaws 8 in. long and will open to 6 in. or 8 in. It will easily be seen why these two vyces are made so differently. No. 2 is mainly for metal work (note shape of jaws). No. 3 (note again the shape) is provided with flat blade jaws, which will hold large sections of timber during the operation of planing. The little hand vyce, No. 2, needs no big explanation; it just allows a better grip on small jobs than could be obtained by holding in the hand.

No. 4 again illustrates how practical a tool can be which is made for a specific purpose. The illustration is of saw-sharpening and setting vyce. It possesses very long, shallow jaws, with a deep cut down the centre, thus allowing the top of the saw blade to be placed at a dead level. Further explanation is superfluous.

Now for a brief description of the final important tools.

These comprise planes, spoke-shave, square, gauges and twist bits. Three illustrations are shown of planes. No. 1 is the JACK plane in wood and the same shape is produced for a try-plane, but the latter is much longer, wider and heavier. Its blade or plane iron is also of greater width. The triplane is used for heavy work, and being long in the base, it is ideal for **shooting joints.** The jack plane proper is used for lighter work, both on large and flat, and is more or less a finishing tool. No. 2 illustrates the wooden smoothing plane. This is the type of tool used to "take off the rough," or, as its name implies, smooth down the work. Being short in its base, there is not the same control over long work. All the types of planes just mentioned are obtainable in steel, as

shown in figure 3. The advantage of steel planes lies in the fact that one can usually get finer adjustments. There is no undue wear on the steel face. No. 4 is one of the most handy small tools on the list, a steel spoke-shave. These are also obtainable in wood. There is little to choose between the two. They are used specifically for fine finishing work. No workshop should be without one. No. 5 illustrates a simple brace. This tool is obtainable in a ratchet variety, the advantage of the latter being that it can be used in a very congested space. By choosing a ratchet brace work with half or quarter action may be done. This is, of course, slower, but allows one to drill holes in otherwise inaccessible places. Unless the handyman is forced to do otherwise, it is far safer to purchase the ratchet type. No. 6 illustrates the normal screwdriver. Nos. 7, 8, 9 and 10 are explained elsewhere.

A few words in passing regarding the twist bit illustrated as No. 11. There are several varieties in twist bits. At the present time it is impossible to buy anything different to the illustrated type, but later on the market should produce the finer types in twist bits. The advantage in the latter is its ability to drill clean holes, whereas there is always the tendency with an ordinary bit to tear the wood, and it is somewhat difficult to explain the difference. One way would be to state that the flat side of the twist of the bit is, in the better class bit, very much wider. Now, this width carries on right up to the cutting face, near the screw centre. This tends to make a wider chisel-like cut and is definitely the best type to purchase.

SOME IMPORTANT HINTS IN WORKSHOP PRACTICE

1. Clean all steel tools after use, and wipe over with an oil rag.

2. Replace all equipment in its right place.

3. Do not stand planes with the irons touching the bench.

4. Clean out the mouths of planes before putting away.

5. Whenever possible sharpen and adjust tools after every job.

6. If planes are to be out of use for a long time, remove the irons.

7. Do not allow the fumes from spirits of salts to come into contact with any metal surface. Instant rust will result and the surface will become pitted.

8. Keep your bench tidy.

9. Sharpen or have sharpened saws which really need it.

10. Use every tool for its correct purpose only.

11. Do not use an ordinary metal hammer to strike a chisel. The correct method is to use a wooden mallet.

12. Do not use a good file on any form of wood work, because the sawdust fills the "cut" of the file.

13. Plan your workshop for good light.

14. Do not use chisels to stir up paint.

15. In the case of pliers, keep each type for its own job.

16. Clean your soldering iron immediately after use; re-tin it if necessary.

17. Sweep up all shavings after each job.

18. When a painting job is finished, clean brushes thoroughly and place in a container in a mixture of water and phenyle. Percentage: 3 parts water, 1 part phenyle.

19. Make it a habit of checking over steel tools at regular intervals when not in use. Rust sets in quickly.

20. Having finished a job during the winter, there is always great danger of rust.

21. A coat of paint on garden tools is one of the best preservatives.

22. Do not throw away scrap whether it be metal, timber or just oddments.

23. Keep a scrap box, and into it throw all odd nuts and bolts, "extra large" screws and similar wares.

24. Make boxes divided into compartments for your screws, rivets, nuts and bolts.

25. Keep all sizes and varieties separate.

Should any reader require further information on equipment, the use of it, or how to purchase same, he is invited to write to the Editor, Box 2323V, c/o G.P.O.

Chapter II.

BOOT AND SHOE REPAIRS

Tools Necessary — Selection of Materials — Buying Leather — Preparatory Work — Finishing Off — Making Your Own Metal "Tips," etc.

THERE is probably no greater saving of housekeeping funds than that attained through the repairing of your own footwear.

Apart even from the matter of hard cash, we have to realise these days that no bootmaker is able to guarantee when you will get a pair of shoes returned which have been left for repairs.

Another aspect of home repairs is the fact that there are so many SMALL jobs which one can do, and do well, at home.

The equipment for the average home shoe-repairer is not extensive OR expensive. An outline of the essential articles required in the kit will be of practical help.

A BOOT LAST.—This should be as solid as possible. An old-fashioned bench "standard" to which you can fit varying sizes of "FEET" is the ideal article. Failing that, you must secure the best type possible. A good second-hand last (if you can secure it) will probably be far better than a new "light cast" model.

A KNIFE.—Yes, buy a correct type shoemaker's knife. It is still obtainable and will last for years. The cost of this knife is about 1/6 or 2/-.

HAMMER.—This is another article which should be the genuine thing — that is to say, you need the correct "snobs hammer." Such a tool is made for the job; it has a wide and rounded "face." This is essential if you are to do the correct hammering. Hammering is a most important part of the work of mending shoes. The new leather is "shaped" on the last before it is fitted to the shoe, and such shaping can only be done correctly with the right hammer. The cost is very small; a good hammer can be bought for 2/6.

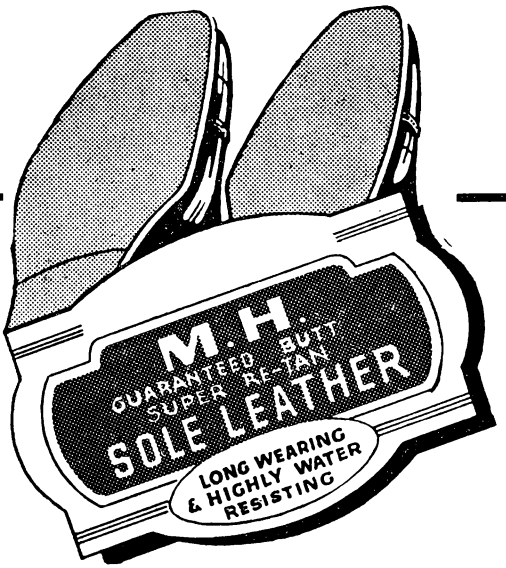
FINISHING IRON.—This is a round-faced iron which is heated and used to finish the edges of both soles and heels. It is quite cheap to buy and lasts for years.

RASP.—A boot rasp is provided with two grades of "teeth" or "cut." It is most necessary and saves much time both in preparation of the shoes and in certain parts of the intermediate processes. Cost is approx. 2/-.

ODDMENTS.—Under this heading we place Emery Paper, Sandpaper, Stains for Leather, Rivets, etc. These will be dealt with more fully in the following pages.

The first operation. Removing old sole. Cut away any stitching, use screwdriver or other blunt tool carefully.

Pull back the sole carefuly till it is clear to the waist of the shoe. Then cut off ON THE BEVEL. Take care not to cut off TOO FAR BACK TOWARDS THE HEEL.



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BOOT REPAIRING

One of the most important instructions in this chapter is the following: Do not let the boots or shoes go too far before repairing. Such a condition not only weakens the remaining portion of the shoe but generally reduces the original base (that is, the upper and first sole) to such a state that it is very difficult for the handyman to effect such good repairs.

Take the job "in hand" before it gets "out of hand." Leave yourself something on which to build the new sole. The normal type of shoe has an original sole of very thin leather. On to this is fitted the main sole; it is the latter which, when worn out, must be replaced and the new sole fitted.

Another point to remember is the leather you buy. You can get good leather in BOTH THIN AND HEAVY weight. Because a piece of leather is thin it does not necessarily mean that it is of bad quality. On the other hand, it is wrong to suppose that all THICK leather is good.

Buy pieces of leather which, as far as is possible, are the same thickness over the whole of their area. Look carefully for blemishes, such as old knife cuts or tears; these occur sometimes during the skinning process, and obviously will weaken the leather when it is cut and put out for sale.

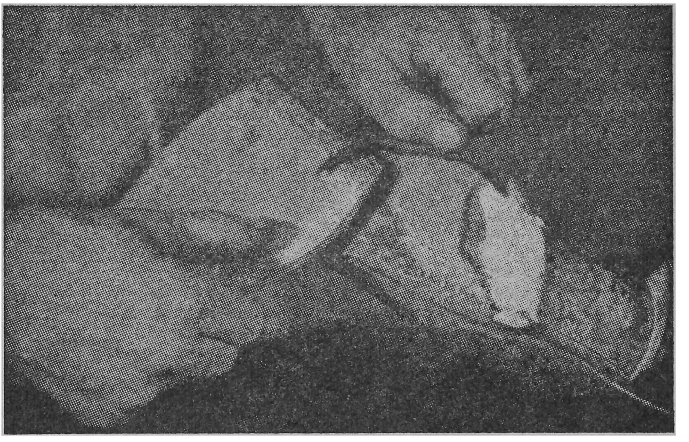
There are a number of patent makes in leather on the market. All of them have something to recommend them; some of them are outstandingly good.

There are two main sorts of leather for purchase by the handyman to-day. The first is the usual type of TANNED leather, the other is GREENHIDE. As its name indicates, the latter is UNTANNED leather. This means that it retains most of the original fats or oils of the hide; it is tough, grey-green in colour, and must not be soaked in water as is the ordinary tanned leather. No matter how long you soak greenhide, it will still remain as stiff as when you started. Any shaping by hammering which you do on this material must be done on the dry leather. Greenhide, as a rule, is tougher and longer-lasting than ordinary tanned leather.

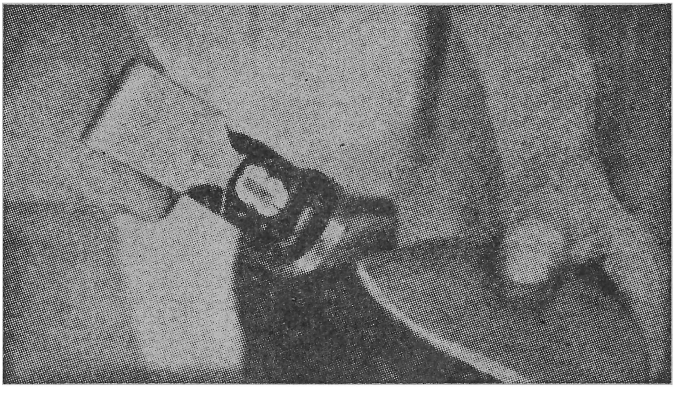
Our first job, then, is to remove the first worn leather sole. The first illustrations show the method. Use a screwdriver or similar tool to lever away the old sole, and after you have raised it sufficiently to do so, get the pincers on to it and roll it right back to the waist of the shoe until you can cut it across. This cutting is done, NOT STRAIGHT ACROSS, but diagonally, and also on the bevel. The latter point is most important, as you have to likewise bevel the new leather sole to fit at the waist.

The second illustration shows the new leather sole being cut to a bevel — ON THE INSIDE, not the reverse.

When you have the old sole right off you must take the rasp and remove any roughness or nail-heads, etc., from the shoes.



Cutting new sole to fit the bevel left at waist of shoe.



Hammer sole well on the boot last; this gives it a "Shape" which will assist in fitting it to the shoe.

Do not throw away the old sole. It forms a handy template or pattern for the new sole. It gives you the right size and saves much trouble all round. Lay it on the new leather and mark all round with a bradawl or similar sharp-pointed implement.

When you have marked the first sole, TURN THE PATTERN OVER. Do not make the mistake of cutting TWO soles for the one side. As soon as you have the new soles cut you need to bevel them to fit the shoes at the waist. Take extra care in this job and it will repay you in carrying out the rest of the work.

When the new leather is cut and bevelled you can soak the soles in water (if they are natural tanned leather); a matter of half an hour or possibly less will suffice to do that job. Remove them from the water and HAMMER THEM OVER THE BOOT LAST. This will give them a MOULDING such as will result in a better and easier FIT on to the shoe.

It must be remembered that all shoes will tend to be ROUNDED at the toe and outer edges through wear. This rounded edge cannot be completely removed, and so we hammer the sole into as much shape as possible before fitting it to the shoe.

You are now ready to "nail on." And here comes a question that many people ask. They say: "Should I use the same size nails for all types of work?" The answer is definitely NO!

Naturally, when we are repairing the soles of ladies' shoes there is not the thickness of leather to allow us to use, say, ½ in. brads; therefore a ⅜ in. brad, or sometimes even a shorter one, is necessary. Use the brad (or rivet, as it is correctly called) to suit the job on hand.

The fine-pointed "tingles" are an excellent fixing for light soles. They are very sharp-pointed and of soft metal; this means that they turn over and "clinch" far easier than the heavier RIVET.

No rivet OR tingle should be longer than just enough to allow it to get through the sole and inner sole and clinch over. Too long a nail will tend to stick up, making walking impossible; it is like a carpenter using a 2-inch nail where 1½ in. would be ample.

Fix your new sole by driving in one or two rivets at the toe. Then, pressing the leather well into position, drive one each side about half-way along, then go back and rivet all the way from the toe round either side. The rivets are driven in at about a quarter inch FROM THE OUTER EDGE OF THE SOLE and approximately ½ in. apart. If the shoe has an extra wide welt you have to place them even further in than a ¼ inch. They must drive through INSIDE the shoe, not through the outer edge of the welt.

Another of our illustrations shows the trimming of the sole after nailing. Care is necessary in this operation. Do not

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LEATHER SOLES

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cut too far into the edge; it is better to trim a little under the necessary amount than find you have left a gap which cannot be filled in.

For finishing off the edge it will be found easy to use sandpaper or a piece of sharp glass. Another very simple method which the writer has used with excellent results is one of the very small steel planes; they are only about 6 in. in length, and if the iron is kept very sharp they will run round the edge with ease and produce a perfect finish.

After finishing in that way you must take steps to stain the edges. One very excellent method is to use ordinary writing ink; it is a quick penetrative and stains well into the leather. If the shoes are tan it will generally be found sufficient to rub the tan polish well in.

Waxing the edges is another important operation. Run the wax well in all round the sole and heels. Then take the round-edged finishing iron and vigorously rub it round all the waxed parts. This will not only cause the wax to penetrate but will also transfer a slight polish. It should be mentioned here that the iron must be hot — NOT very hot, but warm enough to transmit sufficient heat to the wax to run it into the leather.

To make up a good wax take a quarter lb. of Beeswax and about one ounce of resin. Melt the two together and mix well. Pour off hot into a convenient mould (a square tobacco tin is handy). When the wax is set it will shrink sufficiently to remove from the tin. To apply it, you need only hold it in the hand and rub well into the leather; the application of the hot iron will finish the job.

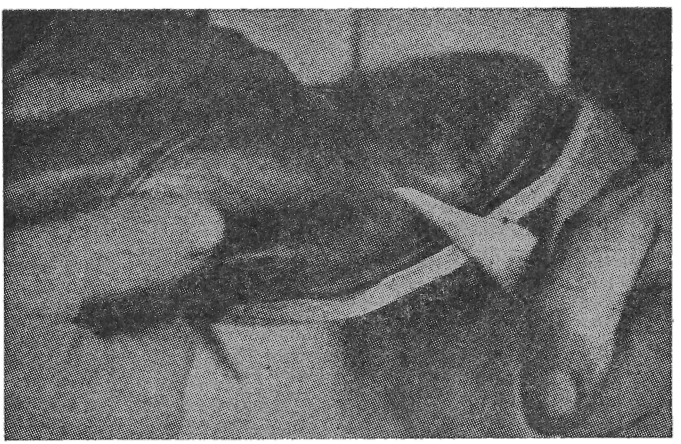
It will sometimes be found that there is quite a hollow in the centre of the shoe when the old sole has been removed. To fill this in by nailing leather over it is almost impossible. Get a piece of felt and cut to required shape and size; this is soft enough to compress into the space desired and at the same time will allow the new sole to be attached without causing a "bump" underneath.

By the removal of the old sole — as noted in the opening remarks of this chapter — you remove the necessity of "building up" a low worn part of the old sole. It is not advisable to place a new sole over the top original sole; the thickness varies considerably in different parts of the foot, and it is almost impossible to get an equal thickness all over.

Now for some hints on HEELS and their repair. There are many sorts of heels in the category of ladies' shoes. Many of them to-day are wooden with only the last two thin layers of leather; sometimes only the ONE last layer is leather. If you intend to do such repairs, they must be started before the heels wear down to anywhere near the wooden portion. This is doubly important in the case of patent leather or similarly covered heels or where there is a covering of some thin material;

once this has become torn and damaged it is past the stage where the average man can repair it. In addition, it is so simple to add one thin section of leather to such a heel.

For repairing ladies' heels, where the whole heel is leather, the method is simple and easier by far than that for the soles. All you need to do is to remove the old worn pieces of leather and build up as you go, taking care to see that the shape of the original heel is retained. To do this, it is wise to leave one shoe untouched while you work on the other; by this means you can work out the shape as you go and make a good job of it. It is also most important that such heels should be repaired before they have worn down two or three layers of leather. Not only are they far more trouble to repair, but the tendency is for the wearer to "turn over" and so throw out of shape the whole of the shoe. This also causes the soles to wear down unevenly, apart from the many foot troubles which may be caused in this way.

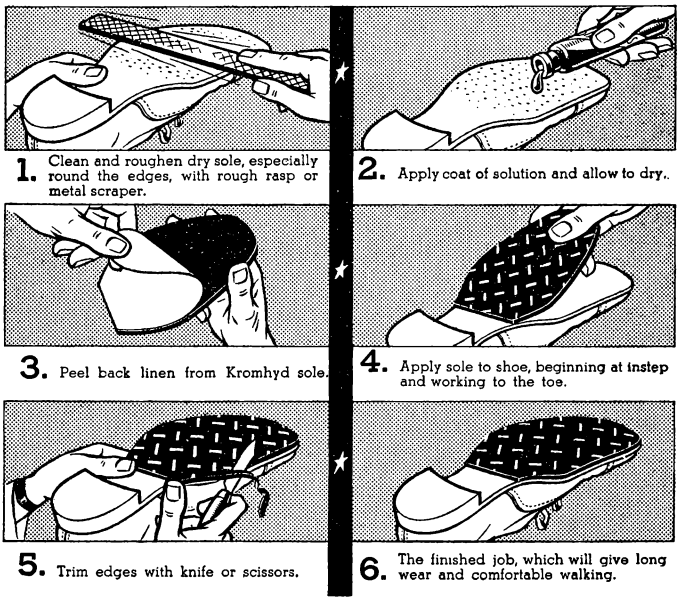


Trimming the sole edge after nailing. This must be done with care; the knife must be very keen edged; too much off will ruin the appearance of the job.

Some people like to "GRAFT" the heels of shoes, particularly men's shoes. To do this you cut the leather ACROSS the heel from side to side and remove the back pieces. This leaves a "step" at the back which is filled in with small pieces of leather. This is a good method when wishing to fit the back of the heels with rubber, when rubber heels are scarce and you happen to have some odd, thick sections of rubber in stock.

How to mend your Shoes with Kromhyd

Shoe Repairing is simplicity itself if you use waterproof, non-slipping, genuine Kromhyd. Thousands of people have proved for themselves that Kromhyd definitely gives longer wear. Ask for ***genuine*** Kromhyd.



1. Clean and roughen dry sole, especially round the edges, with rough rasp or metal scraper.

2. Apply coat of solution and allow to dry.

3. Peel back linen from Kromhyd sole.

4. Apply sole to shoe, beginning at instep and working to the toe.

5. Trim edges with knife or scissors.

6. The finished job, which will give long wear and comfortable walking.

DUNLOP

Kromhyd

OUTWEARS TWO LEATHER SOLES

DUNLOP RUBBER AUSTRALIA LIMITED

The writer has found the hacksaw an excellent tool for cutting across the heel as described above. It is wise to keep an old hacksaw for this purpose, although such work is easy victory for a hacksaw.

When you have built up the heels to the required height, so that the shape is correct, finish off with sandpaper or sharp glass. Then stain and wax as you would for the soles.

Here is a method which has been used quite extensively for the making of the metal "tips" for the toes and heels. Cut some out of galvanised sheet iron. They are quite simple to make in this way, and any size can thus be obtained. The holes for the rivets are made with an ordinary nail or similar sharp instrument.

The need to make our own accessories has brought forth many original ideas, and the foregoing is one.

A piece of emery paper is advised in order to keep the knife in good order. An occasional rub over the emery paper while doing the job will keep a perfect edge on the knife. As a matter of fact, it will be noticed that after the snobbing knife gets a bit worn down it works better than when it is new and the blade long. A short, well-worn knife is easier to manipulate as a rule. As a matter of fact, the writer generally takes off quite a bit of the original blade before he starts using a new knife; this is easily done on a grindstone. Then, if an edge is given the blade ON THE OILSTONE and the emery paper used regularly, no trouble will be found in making good clean cuts.

STICK-ON SOLES.—There is much discussion as to the durability of these. Undoubtedly they are good if properly attached to the leather sole. It is really a job which needs extra good pressure and the shoe left under pressure until the sole dries hard. The main tendency is for the toes and edges to curl up. However, if care is taken, there are some very fine jobs possible by that method.

RUBBER SOLES.—The use of rubber for home shoe-repairing has become most popular, not only because of the long-wearing quality, but because of the extreme simplicity of application.

This is particularly the case with the "stick-on" type of sole, made from 1-16th in. rubber and sold usually with a linen or other backing which protects the coat of tacky solution already applied.

This is sold complete with an outfit including a scraper and solution. To attach the sole firmly to the shoe, all you do is to clean and roughen the sole—especially around the edges —with the metal scraper supplied or with a rough wood rasp. Then, when the leather has become very rough and furry, apply a coat of the solution and allow it to dry thoroughly. After this, peel back the linen from the rubber sole and apply to the shoe, beginning at the instep and work-

ing back to the toe. When the sole is firmly attached you can trim the edges with a wet knife or even with a pair of scissors.

Other thicknesses of rubber are available for soling, including $\frac{1}{8}$ in., $\frac{5}{32}$ in., and $\frac{3}{16}$ in., none of them being at all expensive. The heavier type usually is available in both the sheet and in shaped soles; they are usually tacked on to the leather sole.

Some home repairers have found it a good idea to nail a metal plate on the toe-cap over the rubber. This prevents any chance of the sole coming away from the leather; it has been found most effective, particularly with children's shoes. Rubber, by the way, is widely used for children's shoes, because it withstands a good deal more hard usage than do other types of soling materials. Additionally, it is waterproof and non-slipping.

Two other tips for home-shoe-repairers using rubber are: (1) Never work on shoes when they are wet or greasy; and (2) never put a rubber sole on a badly worn pair of shoes.

Rubber heels are, of course, widely used, but their application is so simple and obvious that we shall not trouble our readers with a description of the process.

Chapter III.

DAMP WALLS, THEIR CAUSES & CURES

IN dealing with the above subject it must be realised that with all the remedies submitted it is still possible that dampness in walls may emanate from some cause not specified in this chapter. It will be wise to mention some types of dampness.

CONDENSATION.—This type of damp is due to the particular type of wall surface plus atmospheric conditions. Lining with a decent wall board is a cure. Lining must be attached to studs well away from the wall.

POROUS WALLS.—This trouble is found very often in walls of the NON-CAVITY type. It is due to poor quality bricks or stone or porous mortar joints, and can be cured by painting or similar treatment of the whole of the outside surfaces. Good paint or oil treatment is the best, and if well done should last for years.

DEFECTIVE ROOFS.—These are often the cause of dampness in the walls; the slates, tiles or iron may be defective or broken in parts, and thus allow the water to enter and run down or soak down the walls. An inspection of the roof itself is imperative and also the "flashings" round the chimneys and similar parts. Repairs to such defects are, as a rule, fairly simple, and amount mainly to replacing the mortar in the brickwork over the flashings.

DEFECTIVE DAMPCOURSE.—This is the most common of all faults, and generally the one to blame for the dampness. The only real remedy is to replace all the dampcourse a section at a time. This is a difficult job and hardly one for the handyman to tackle, as it involves taking out a section of the bricks over the dampcourse and laying a new dampcourse, and then relaying the bricks before removing the next section.

GARDENS BUILT UP TOO HIGH.—This is often the cause of much trouble in house walls. If the garden soil is higher than the dampcourse you are bound to have moisture finding its way into the wall OVER the dampcourse.

Dampcourse must be above the outside soil and below the floor timbers. This is a valuable hint to keep in mind and may save you a deal of trouble.

Salt damp is a trouble which is only too common in old houses without cavity walls, and appears in rising patches of damp with a salty edge and white appearance. In the winter time you will notice this, but not so often during the summer. It is a rising damp and comes from the ground. Almost without exception you will find that the wall so affected is without dampcourse and is, of course, a NON-CAVITY wall. It is also very often found that the property is so old, and often delapidated that it would not pay to place a good dampcourse right round the walls.

DAMP FLOORS.—This is an entirely different type of dampness from that arising from the underwall or through lack of dampcourse and may be termed really a condensation of moisture under the floor boards. Almost without exception you will find that it is caused through lack of sufficient ventilation. Place more air vents at both ends or at either side of the walls under the floors and you are fairly sure of a cure.

It will be wise to deal with one or two of the troubles which can be corrected by the handyman. To make this point clear, it is necessary to state that in the case of defective dampcourse or similar causes of damp, in nine out of ten cases the work will have to be done by a tradesman. The same applies when it becomes necessary to what we term "under-pin" any portion of the house. This under-pinning necessitates the removal from the dampcourse level down to the foundation material of all concrete or brick foundations. When a solid level is arrived at, concrete is re-poured in the form of a solid brick upon the ordinary level, thus taking the weight of the house walls at that particular point. This explanation is given to show the difficulties facing a handyman who, of necessity, will not have equipment to handle such a job. Therefore we will make it quite clear as we proceed as to what type of jobs can be done by the home workman.

Walls consist of two types: First, old fashioned buildings where they are invariably built with single walls. This may have been of brick, concrete, or, as is often seen, very solid bluestone walls. It may be asked why many of these old buildings are free from damp troubles, while others may be termed "almost wet" at certain seasons of the year. The fault probably lies in either inferior dampcourse or water penetrating from the outside. The latter point has been associated with the weather side of the house. In all modern places the walls are of the CAVITY type. These are built actually of two separate walls of brick with a space or "cavity" between the two. In passing we might mention that this is the reason why, when building the cool safes spoken of by "Domus," we need cavity walls, securing by their use a through draught. This last remark automatically gives an answer to the question, "Why are cavity walls better than single walls?" The draught is the most important factor in prevention of damp and also is an additional cooling medium in hot weather. It must be realised, however, that, cavity or no cavity, if the dampcourse is broken away or inferior in quality, damp will penetrate, the reason for this being that the base of the wall MUST at some point become solid, even if not until it reaches the foundations. It is very seldom that any building of the cavity wall type suffers from dampness, and if it does it is safe to assume that such dampness is NOT caused by penetration from the outside. It is due to something defective on or near the dampcourse level. It is suggested here that it will be wise to introduce one or two recipes for making material with which to dry exterior walls. Such recipes should still be possible to make, even with war-time disabilities. Four recipes are given.

Recipe No. 1 is for damp wall treatment. 50 parts by measure of clean, dry sand, 50 of Limestone (not burned), reduced to grains the size of the sand, and TEN parts of Red Lead. The building to receive this recipe should first be covered with three coats of boiled oil, brushed on, and allowed to dry well before applying the above mixture. Lay on the latter with a trowel as a top float. In a matter of months it will become hard as stone.

Recipe No. 2.—Measure 100 parts of clean, dry sand, 100 of powdered Limestone, and FIVE of Red Lead. Make into a hard paste and apply as in the case of No. 1.

Recipe No. 3.—100 parts of sand, 50 parts of whiting, and TEN of Red Lead, made up into a moderately hard paste or cement and applied as you would a float of Cement.

Recipe No. 4.—100 parts of sand, 25 parts Plaster of Paris (or same of Marble Dust), 10 parts of Red Lead and 5 of Yellow Ochre. This makes an excellent cement, both in colour and hard drying qualities.

All these recipes are mixed with boiled oil and the ingredients mixed to form a paste of sufficient consistency to allow of trowelling on to the wall. Sand and Limestone must be perfectly dry. Use a piece of flywire as a sieve.

The condensation of moisture is invariably associated with single walls, and it will be noticed that such walls are invariably painted on the inside. Also, they are generally kitchen walls, and this moisture is caused by steam heat, from cooking, and as the wall is painted no absorption of moisture *into* the wall can take place. This can be tested by the simple expedient of taking a cold piece of steel or knife blade and hold it against the steam of a kettle, as everybody knows steam *condenses* on a cold surface. Probably, if you held a piece of Plaster of Paris (broken off from the top float of an ordinary interior wall) against the same steam, you would find that at least two-thirds of the moisture collected would be absorbed by the Plaster. This is a simple explanation, and should prove the point. A cure for this condensation is somewhat difficult to advise; extra ventilators will help, but it is to be recommended that such walls ought to be left in a plain plastered state.

In conclusion, let it be said that condensation will take place generally overnight on such walls, and also on the interior of galvanised iron walls which, as we know, are often found in the form of "extra rooms" added to the main building. In both cases, whether the walls are iron or other material, the most satisfactory treatment is to line them. Such lining can be attached by means of "studs" fitted against the wall and then by nailing lining to the stud work. (Further information on this subject is obtainable by communicating with the Editor.)

To mention another trap which is found linked with dampness.—This is the fact that gardens are often built up so that

the earth level finishes above the dampcourse. When this is the case, the earth itself forms a syphon for water from the lower levels up the bricks. Once the damp is above the dampcourse it must go up the wall.

SALT DAMP.—This is actually a dampness arising more or less from underground. It will be noticed in old houses of the single wall type, in the form of regular shaped patches from the skirting board rising to about 3 or 4 feet. Wall paper and Plaster float both rot and crumble away and, after a time, if the wall is of brick, this also frets away. If the property is valuable, the proper cure is the removal of a section of the wall at a time, at a low level and, as each length is underpinned, a dampcourse is inserted. Such walls, however, are, in properties which are very old, seldom worth the outlay.

DAMP RISING THROUGH FLOORS.—During winter months many people are horrified to discover dampness in the actual floorboards. Where lino is laid in such rooms, mildew will result, and, in the case of carpets, the damage may become irreparable and also a musty damp odour permeates the room. Fortunately, a certain cure can, in almost every case, be effected. The cause is insufficient draught under the floors. By the fitting of additional ventilators under the floor level in the walls, this trouble should disappear.

It is realised that this subject has been dealt with only in part. Any further information will be gladly supplied by the Editor, Box 2323V, G.P.O., Melbourne.

Chapter IV.

SOLDERING & METALWORK

EQUIPMENT FOR SOLDERING. TINNING. SOFT SOLDERING OF BULKY ARTICLES. FLUXES, TYPES OF SOLDER. TINNING A "BIT" WITHOUT A FLUX. GENERAL HINTS.

SO many requests have been received from time to time, as a result of broadcast lectures, that it was decided to include in this book a chapter specially prepared for those handymen who seem to find soldering a difficult job.

Actually, like many other types of work, the job itself is not hard. The main reason why so many people fail to "make a job of it" is because insufficient care is taken in the initial stages. The preparation of any work, as has been pointed out many times, is the important and indeed ESSENTIAL step to success.

Particularly in these days, when materials are so hard to get, soldering really comes into its own. By materials is meant actually articles for home. Only a matter of weeks before this chapter was written the writer had occasion to procure a good solid drinking pannikin. This was found to be impossible, therefore only one thing remainded . . . one had to be made; this was done, and, when finished, not only was the article superior to a standard shop line, but there was the added satisfaction of having "made it myself."

In the kitchen of any home we find the need for constant little attention with the soldering iron, and it is with the desire to help the handyman that this chapter is written. Facts which do not really interest the average handyman are omitted. Heavy technical details are not regarded as essential to a simple chapter on soldering, as all our readers are aware by now that the Editor is only too willing to submit further particulars on any subject in which people are interested. The main ideas in these early publications is to provide for the average handyman AND woman the necessary help to carry out the simple jobs needing attention.

EQUIPMENT FOR SOLDERING.—This is probably the most simple and inexpensive of any department in the workshop. Unless one goes in for heavy brazing or Oxy-welding work, it means a very small outlay for the essential tools. Some of the latter are the tools used in other types of work and are therefore already on hand.

The main item, of course, is the soldering iron, or copper "BIT," as it is technically termed. These are made in varying weights. One is illustrated in the tool section of this book, and is a simple piece of square copper fastened to an iron shaft, which, in its turn, fits into a wooden handle. These bits are obtainable without the handles if necesary, so that you can

use the old handle for a new bit if you wish. As has been stated, the weights of these bits differ. From two or three ounces they run up to a pound and over in weight. It is obvious that the larger the iron the more heat it will retain, also the harder it will be to manipulate on the bench. For heavy plumbing work you would need a range of two or three irons to cover various types of job. For the home handyman it is sufficient to buy a good Bit of about 8 oz. or a little heavier. Keep your eyes open for a good used Bit; as a rule they are quite good and will last out all you will need.

As stated, these Bits are copper. Before you are able to soldier with them it is necessary to "TIN" them; this simply means the transfering of a coating of tin, or solder, on to the faces of the Bit. The latter should first be quite clean. Take a fine cut file and see that the four surfaces ARE clean; sandpaper will do unless you have an iron which has attached to it a great roughness of solder blobs; this should never really be, but sometimes we find an iron in that condition. Then the file must be used to bring the surfaces down to the correct level and condition.

The reason for the tinning of the iron is that the latter must be capable of "carrying" small quantities of solder to the work in hand; in other words, the "tinned" Bit must hold on to the solder, or vice versa. This action comes about by CAPILLARITY; thus, when the iron is held on the work in hand, with the solder resting on the hot point of the iron, the heat melts the solder, which flows in a thin and steady stream. This stream will "follow" the iron as the latter is moved forward or backwards.

By the method just described you get an even and thin coating of solder on the work in hand. A soldering job must not be a series of metal "blobs"; that is botching the work and NOT soldering. Neither is there any need for it; the job is stronger if correctly done and looks as it should look, "a real soldering job."

Actually the medium through which the heat from the iron is conveyed to the work in hand is the solder itself. The Bit is held a fraction of an inch AWAY from the surface of the work. A feature of solder is the fact that it is almost as good a conductor of heat as copper. If you do not believe the latter point, try picking up a short length of solder after you have been using it for five minutes or so.

FLUXES.—Here is a point upon which opinion is divided. There is a whole range of fluxes, and although the handyman will not be needing many of them, it is intended to give a few in order that all the knowledge possible may be contained in this chapter. Also, this subject is dealt with at this juncture in order to prepare readers for some of the remarks on tinning which appear later.

The best known and generally used flux is CHLORIDE of ZINC. Used as a liquid solution, it actually covers the work with a film or varnish-like coating. It is made by the simple

process of taking "spirits of salts" and "killing" the spirits before use. Use an earthenware container for the spirits and drop into it some pieces of ZINC. You will notice a severe bubbling and boiling of the spirits as it literally "eats" the zinc away. Add zinc until all boiling of the spirit ceases; it is then ready to be poured off into a bottle and corked against the day you require it. A RUBBER cork must be provided, or alternately, cork the bottle with an ordinary cork AFTER the spirits have drained away from the inside of the top of the bottle. DO NOT "kill" the spirits in the bottle in which you obtained them from the chemist or storekeeper; they are very drastic in action, and the severe boiling of the contents of the bottle when you add the zinc may quite easily lead to damage to clothes and yourself if the spirits boil over and contact materials or flesh.

Another tip: Do this killing job in the open air; the fumes from the spirits are deadly if inhaled. Remember also that these fumes, if allowed to come in contact with steel and other metals, will set up an immediate and deadly rust. It all sounds very frightening; actually, it is only a matter of care and seeing that the spirits DO NOT come in contact with things they can harm.

FLUX FOR LEAD SOLDERING.—The above solution for lead soldering is apt to cause tarnishing, so we look to something a little different for a lead job. TALLOW is specially suitable; or, resin and tallow may be used. Actually the tallow by itself will be found the best for lead.

BRIGHT TINPLATE SOLDERING.—RESIN or TALLOW is ideal for soldering bright tinplate or for brass soldering which has ALREADY BEEN TINNED.

In soldering electric wires and those in radio sets the first named flux is not advisable. Any of this flux which may, and probably will, remain in cavities or between wires will set up "electrolysis"; as soon as current passes through chemical disassociation takes place and results in corrosion. In tackling such work it is wise to stick to plain RESIN unless you use one of the special fluxes on the market for this work.

CORE SOLDER is sold for work on wiring, etc. This is a solder generally sold in coils; it is very flexible, and has a core of flux with an outer casing of soldering metal.

Details of other special fluxes and their formulas will be supplied if desired.

While on this portion of the chapter let us see what are the ingredients for various types of solder for certain jobs. It will be clearly realised that what is suitable for ordinary work would be useless in, say, the soldering of iron or steel, likewise for brass; therefore, for those who are interested we supply the following details of solders and quantities for making:

Plumbers' Coarse Solder.—Two parts LEAD and ONE part tin. Tinman's solder is composed of 3 parts TIN and 2 parts

LEAD; for tinman's common solder use one part tin and one part lead.

Hard Solder for BRASS.—This is a brazing solder. 3 parts COPPER, 2 parts zinc, 2 parts silver. Melt the copper first, next add SILVER, and lastly the ZINC. As soon as zinc is immersed pour into moulds.

Hard Solder for COPPER.—3 parts COPPER, 3 parts ZINC, 2 parts SILVER.

Hard Solder for STEEL Joining.—Melt 19 parts fine silver under a layer of charcoal, add ONE part copper and 2 parts pin-brass wire.

Hard Solder for IRON.—2 parts COPPER, 2 parts ZINC. For very strong solder use ONE part ZINC.

Pewter Solder.—2 parts BISMUTH, 1 part LEAD, 1 part TIN. Melt the lead first, add the tin, then the bismuth. Sprinkle a small quantity of resin on the molten mass to prevent oxidisation.

Now we can attend to the matter of tinning the soldering iron. This is quite a simple process and one which, although most important, will soon be mastered.

Take two receptacles (small cups or similar articles) and fill each to within half an inch or so of the top with soldering flux (killed in spirits). In addition, you will want a thin piece of wood, or a thin rod of bakelite; this can be used to transfer the spirits on to the job in hand. Have handy (at all times) an ordinary brick or half brick; this is to stand the hot soldering iron on while not in use.

Heat the Bit in the fire or over a gas ring until it is sufficiently hot. One way to gauge the heat of a Copper Bit is to notice it as the flame from the gas or coal starts to show the brilliant green and blue lights round the iron; this does not take place until the iron is fairly hot, and is a good time to withdraw it.

As you withdraw it, take your file and rapidly clean all four sides of the copper iron. Now dip in quickly into the container of spirits, the one without the dropper in it; withdraw it at once and touch the end of the stick of solder with it. The metal should flow over and adhere to the bit; sometimes a slight rub on a piece of sandpaper or the file is necessary. In the latter case a second contact with the solder will be needed. In any case, the Bit must be properly tinned before going on with any job.

That, in short, is the standard rule for tinning a Copper Bit. If you do not succeed the first time it will not take you very long to do so. The main reason for NOT succeeding would be an insufficiently cleaned Bit, too hot a Bit, or some equally simple cause.

The second container of spirits or flux is kept as a "clean" lot of spirits for dropping on the work before you apply the iron and solder.

In the soldering of, say, two small objects, it is wise to tin each of them first before you attempt to actually solder them. This is in the case of the articles being brass, and we come across a lot of small brass articles which need attention in this way. Take each part at a time and drop on it a small quantity of the flux; run it right round the part to be soldered, then take the iron with a very small amount of solder attached and run it round the same path as the flux has taken. The iron should leave a thin layer or "tinning" of solder on the article. Do the same with the other piece to be joined, and, when wiped off with a piece of rag the two parts are ready for the attention of the iron to join them. This "pre-tinning" saves a lot of trouble in finishing the job. You have both surfaces "receptive" to the solder as it is melted by the iron and run on to the surfaces to be joined.

At this juncture it is necessary to mention the need for extra care in doing such work as soldering milk cans. There is a film of light grease on a milk can, however clean it appears to be, and it is wise to take a piece of very fine sandpaper and rub the surface gently but firmly. This should remove any film of grease which may have been left; the flux should then do the rest. Particular care must be taken to thoroughly clean the part repaired after you have soldered; the flux is apt to hang around the job unless thoroughly removed. Also, for milk cans, it is necessary to use a good quality solder containing three parts tin and two parts lead; nothing coarser than that is recommended.

Here is a method for soldering by "soaking-in." This is most useful where a joint has to be steam or water tight. One often finds in a job of this sort, where it is accomplished with a soldering bit only and where no previous tinning has been done, that tiny air-holes persistently appear and spoil the job. Try the following method:—

This method of "soaking" has the advantage of helping to fill up the flaws and pinholes. We will take as an example two pieces of brass tube which will just nicely fit into each other and have to be soldered in that position. When the two parts are fitted accurately the two sections must be amalgamated with soft solder by the use of the bit and the soldering flux, or alternately heating the metal and applying flux and solder.

After that, heat each piece separately and wipe off all excess solder. Files, one round for the inside and the other flat, can be used with care for removing any rough parts of the soldered surface. A metal scraper is excellent for this job. As soon as you have a TIGHT FIT, or "DRIVING FIT," as it is sometimes termed, you can drive one piece of tube into the other; you now have a snug and tight fit.

Now apply the usual flux, and heat the work over gas or similar heat. It is advisable to heat to a little ABOVE the melting point of the solder. Next apply the solder to the joint

and keep the work hot for a little time; this will allow such an interfusion that the joint will be water and steam tight and cannot be undone. It is the perfect form of soldering for jobs which must be sound throughout. For an ordinary joining job where no water or pressure will have to be withstood, it is not necessary to go to quite so much trouble.

TINNING THE BIT WITHOUT SOLDERING SOLUTION.—The Bit, if necessary, may be tinned without the use of Chloride of Zinc. This is done by heating the Bit as required. Clean the end with file. Press immediately into lump of resin. This should induce the Bit to take on a little solder. If so, the solder can be made to spread by rubbing on a brick or stone on which a little powdered resin has been spread. As an aid to this process a lump of Sal Ammoniac is kept handy on the bench and the hot Bit is worked into this before rubbing the resin. The Sal Ammoniac acts somewhat as a chemical deterrent on the slightly oxidised copper; this forms volatile chloride of copper, but the delay in reaching the resin often offsets the advantage of this action.

For further information on the more complicated forms of soldering and brazing, readers are invited to write to the Editor, Box 2323V, G.P.O., Melbourne.

Chapter V.

CEMENT & CONCRETE

Portland Cement. Nature Cements. Concrete. Mixtures. Measuring for Accuracy. Mixing Aggregates and Cement. Penetration Method. Building Blocks. General Hints.

IN compiling this chapter it is felt that it will give an additional help to that already written in the first "Wartime Handyman's Book." Owing to lack of space in that volume many of the points which are of general interest to the handyman could only be briefly mentioned.

This chapter, combined with that in the first book, should give a very complete, if short, description of the points that really matter in cement and concrete work.

In addition to points of general interest, the table of mixes will meet with general approval. In it will be found the answer to practically every question which arises with regard to quantities for every job with which the handyman is likely to be faced — and many others.

PORTLAND CEMENT.—This cement is a combination of Limestone and Clay; these ingredients are finely ground and thoroughly mixed.

They are then carefully tested by chemists and burned. This burning is done in rotary kilns, the heat being up to 2,500 deg. Fahr. This means a fusing of the materials, resulting in a set of new and complex chemical compounds, consisting of LIME, SILICA and ALUMINA, which pass continually from the kilns in the form of hard, small particles of clinker. This is then ground to a powder which passes through the meshes of microscopically fine sieves. When finished, it has assumed the familiar grey colour of the cement as we know it. It is owing to its similarity in colour to the grey stone quarried at Portland, England, that it is termed PORTLAND CEMENT.

There are also some limes which are somewhat like cement in their composition. They are not pure CALCIUM CARBONATE, or a pure CALCIUM chemical, but contain, in addition, some silica, and therefore constitute what is known as NATURAL cement. In some parts of the globe there are natural deposits on the surface which, when kiln-burned and ground up into powder, have to a certain extent characteristics similar to Portland cement, which will set slowly with water. Some of the structural work carried out by the Greeks and the Romans may be strictly classed as concrete work. Some of these natural or primitive cements have stood up to wear and

tear for as long as 2,000 or 3,000 years. To-day, with modern science to back them, cements will beat even that record.

Many people seem to fail to realise the difference between CEMENT and CONCRETE. Concrete is CEMENT plus—WHAT? Its addition is something which will give GREATER strength than the cement alone and will result in a material almost indestructible.

Just plain cement will "set" and become such a solid mass that it is hard to break, but by the addition of other ingredients we can so strengthen it that, as has just been said, it is practically indestructible.

Gravel, stones, sand and stone-dust are called AGGREGATES. They are used with cement and water to increase BULK. They also reduce the cost of construction work owing to the fact that they are the cheaper of the two ingredients —CEMENT and AGGREGATES. Therefore, the greater the quantity of aggregates we can use in a mixture the cheaper will be the cost.

With the foregoing remark a word of warning. Do not be tempted to reduce cost at the expense of quality. Past a certain percentage of aggregates we loose STRENGTH, which is the secret of good concrete work. There is a practical limit to the quantities one can use when mixing concrete. There is, of course, a "tolerance," and this permits us to swerve a little either side of the exact quantities given without danger to the quality of the work.

Stone-dust, sand, or any other material which will pass through the meshes of a ¼ in. mesh sieve are classed as FINE AGGREGATES. All such materials of a LARGER SIZE are classed as COARSE AGGREGATES.

GRAVEL is water-worn stones, usually of the quartz variety type, washed down from rivers during floods. In these "washings" from rivers we may find granite or other types of rock, but if they are "waterworn," that is, rounded off with smooth edges, they are all classed as gravel.

The familiar "screenings" which we see so much of is actually the fine parties of broken-off stone from quarries where the stone is crushed or broken down by hammers, afterwards being sorted out by passing through sieves of various sizes, that is, automatically graded.

SAND.—This again has its origin in rock or quartz. It is "broken down" from such rock or quartz during flood time and washed downstream, banked up on the corners or turns of rivers into "banks," blown by the wind out to sea, and then again banked up on beaches by the tides.

Sand, as we all know, drifts badly, and if one needs proof of this it is seen in the sandhills in various parts of the country and in many parts of the coasts of Australia or any other country. In the Loxton district of South Australia it is possible

to see the tops of the THIRD and FOURTH fences above the sand which has drifted and become so menacing as to prevent the land being worked at all. So much for sand.

MIXTURES.—Concrete mixtures can be "just right" or they can vary a little OFF being just right. This is a matter which is in one's own hands to control. The ideal mixture has just enough fine aggregate or sand to fill the empty spaces between the pieces of COARSE AGGREGATE; then we add sufficient CEMENT to fill the remaining spaces.

The mix generally recognised to be ideal is 1:2:4, which means in simple words that you will want ONE PART CEMENT, TWO PARTS SAND, and FOUR PARTS GRAVEL and/or CRUSHED STONE.

In the case of virtually unimportant masses, such as retaining walls or similar constructions, when bulk and solid MASS are more important than strength, the job is cheapened by using more stone and sand; such a mix would work out at 1:3:5. The result of such a mixture would be a well-bound job, but NOT a watertight one, owing to the fact that insufficient CEMENT is used to fill the voids between the sand and coarse aggregate. For a road, pavement, or building, such a mix would be unsuitable.

THE MIXING OF AGGREGATES AND CEMENT.—Do not make up your mind that because you have 1 part cement, 4 parts of stone and 2 parts of sand that you have a total of 7 parts of concrete. Much of the mixture is composed of spaces between the mass known as "VOIDS." These voids occur between the particles of stones. Generally speaking, these voids between the stones are filled with 2 parts of sand.

And then, again, the sand will also have voids; these must be filled with the cement. The well-known concrete 1:2:4 possesses slightly more sand than the voids in the stones. Likewise, the measure of cement has a slightly greater measure than is necessary to fill in the voids in the sand. Therefore, there is slightly more than 4 parts of concrete made from a 1:2:4 mix. According to the sizes of the particles in the sand and stones, so there will be slightly more or less than 4½ parts of concrete.

MEASURING.—All materials should be measured, including the water. The hit or miss method is NOT good enough for accurate work and will tend to disappointment in the finished job. Also, it is quite easy to measure and be SURE. The way you purchase cement is in 94 lb. bags. This is equal in quantity to ONE CUBIC FOOT. Therefore, to balance up this measurement and make the job easy, see that your other ingredients are also measured by CUBIC FEET. It is a simple matter to knock up a box with inside measurements 12 in. square by 12 in. high. This gives you ONE CUBIC FOOT MEASUREMENT. Failing a box, you can utilise that most useful of articles, the kerosene tin. Three of these tins will hold sufficient to make three cubic feet.

Remember that it IS possible to have a mixture which is TOO RICH. The 1:2:3 mixture is the one which is recognised as having a very high strength, and is used in beams in large buildings and for bridge work. That, however, does not give you a free hand to keep on increasing the percentage of cement.

Make it a rule to stick to standard measurements.

PENETRATION METHOD

Many people have enquired as to the method known as the Penetration Method. This method is not new; for years it has been uesd for road work, and there are many miles of road work in Australia to-day carrying regular and heavy traffic. It may be described as a quicker and less arduous method of work for the small home-owner than the standard concrete method. It is NOT, however, suitable for EVERY class of work.

For garden paths it is excellent and as a basis for explanation we will use the garden path as the example.

The coarse aggregates or stones are spread out in a regular way at the base of the excavation which will be the path; they are spread just as they are broken up, and NOT mixed with any other material. This means that you avoid the back-breaking task of shovelling the wet concrete and turning it over and over in the mixing process.

The broken pieces of brick or stone are either rolled or well tamped down. This has the tendency to fill up many spaces or voids between the pieces of aggregate, thus saving a lot of cement. The saving is considered by the manufacturers of cement to be so great that a bag of cement can be made to cover almost double the area of finished path to that obtained by using the standard concrete mixture of 1:2½:4.

The "GROUT" or mixture is made with CEMENT, SAND and WATER, and is the consistency of thin cream. This means that when poured on to the broken up bricks and stones it will PENETRATE to the voids in the lower layer. If the job you are going to do is small, you can mix the grout in an ordinary bucket. If, however, the job is a big one, it is wise to try and hire a hand-operated mixer.

HOW TO DO A JOB.—Prepare foundations in the normal manner by excavating to the depth required and placing in the bottom of the excavation a bed of ashes or sand if the base is clay.

Next cover with a layer of sand (a light layer only). This is followed by a layer of screenings, gravel or broken-up pieces of old brick or stone; broken ashphalt will also do the job. Any screenings used must be free from dust; this will prevent the penetration of the grout and MUST be avoided.

Roll in with a roller if possible; this will assure a good level. When rolled, go over the entire surface and fill in any slight depressions with screenings to secure a perfect level. Just

before you pour in the cement mixture water the screenings down with the hose, NOT heavily, but sufficient to wet them. This will prevent the stones from absorbing the water from the wet grout when poured.

Here is the simplest method of mixing the grout: Obtain two buckets and one or two clean jam tins. The sand must be FINE and CLEAN. You can use the fine sand favoured by plasterers for finishing work. Each batch you make consists of ONE MEASURE of CEMENT, not more than 2½ of fine sand, and about 1½ measures of water. Tip the water into the bucket FIRST, then the sand; stir round with flat stick and then pour in slowly the measure of CEMENT. Stir until the ingredients are nicely blended and they will then be ready to pour into the path. Use your jam tins as measures.

Sufficient grout should be poured to FLUSH THE LAYER OF STONES FULL TO THE SURFACE and a steel float used to pack the stones down for a good flat top. Water will "work up" with this trowelling and can be allowed to run off provided you do not allow CEMENT to run away with it.

Do this work in lengths of, say, 4 feet, or less if desired. You can divide these sections with pieces of plywood or similar thin material and remove the pieces before the final fiishing of the surface.

About 30 or 40 minutes after grouting a top surface is recommended. This consists of 1 part cement to 2¼ parts of sand, with 1¼ parts of water. Screed off this top grout, which is stiffer than the early pourings, and it will be ready for hand-trowelling in about one hour.

Do not allow concrete paths to dry out quickly. Twenty-four hours after putting concrete down it should be saturated with water; in fact, under twenty four hours. This will ensure steady drying and guarantee the life of the job.

For those readers who have old asphalt paths the penetration method will convert them into good concrete paths. Dig up the asphalt and break up with hammers, and then treat it as thought it were the standard stone aggregate.

BUILDING BLOCKS or BUILDING SHEETS.—There has been much enquiry as to whether the average handyman can make his own cement sheets. People who ask these questions have in mind the thin type of fibro-cement sheet so favoured for all sorts of buildings and lining jobs. The answer to this question is NO. It is quite impossible for the average man in the home workshop to turn out a thin- light-weight cement sheet. The manufacturing process for these sheets is a complicated one and requires rolling pressure among other things.

For the information of readers we offer the following suggestions: Use either building blocks of concrete, or as an alternative, cement washed or petrified hessian.

The first method, that of the building block, is simple. Once you have decided upon the size of the blocks you require, all you need to do is to make the moulds or forms. Line these

with paper or oil the sides of the moulds to assist easy removal of the blocks. Make your concrete to the standard mix for the job and fill the moulds. A number of moulds is advisable, but for the man with very little "extra" to spend it is possible to make a very small quantity of blocks at a time. The job will take longer, but you will get there just the same.

Such blocks, when finished, will be built up into a wall by using a cement mortar. The alternate method to this to build up each wall first with "forms" or moulds and pour in the concrete. Most handymen prefer the "block idea" because of the easier work, the small mixes (if necessary), plus the fact that they can do a few at a time and not have to finish off a long "run" of wall with the big mix, which would be necessary to complete it.

Another way of getting a thin "WALL" if desired is the CEMENT WASHED or PETRIFIED HESSIAN method.

One thing is essential in this work, and that is good, strong framework or studs and cross ties. If this point is attended to you will find the method a very excellent one.

The jute hessian recommended is the 12½ oz. grade. This is of sufficiently open texture to allow the cement to pass through the "weave" and yet strong enough to hold up in lengths for walls and roof.

Endeavour to do this type of work when there is not too much wind or sun, as the amount of cement used is so thin that the drying out may be too quick and the job spoiled. The cool of the evening is the best time.

First erect a framework of timber and roll one end of the hessian right round one end of the frame for strength. Carry it right over the top edges of the frame and secure at all parts with ¾ in. flat head nails or "clouts." See that in the nailing the weight is equally distributed and does not tend to tear the hessian.

Wet thoroughly by hosing. This should be done at least an hour before starting the job.

The cement paint is made of EQUAL volumes of PORTLAND CEMENT, FINE SAND and WATER. Stir thoroughly to remove all lumps or dry patches.

Next apply to the hessian with an ordinary wide paint or kalsomine brush.

Next day you will find the cement set hard and filled the openings in the hessian. Only one side of the hessian need be painted; it will penetrate to the other side and congeal.

Protect the damp cement from drying by hosing it as soon as it has set hard enough to prevent the water from washing it away.

Keep the surface damped for a week at least if you want the best results.

The amount of cement required to make petrified hessian would be about 3 lb. per square yard. The cost should be about 2d. per square yard.

In dry districts, when difficulty is found in preventing the work from drying too quickly, chemical treatment by the use of CALCIUM CHLORIDE may be resorted to.

This chemical can be purchased for somewhere about 6d. a pound, and is dissolved at the rate of 1 pound to three gallons of water BEFORE adding the cement.

This chemical will cause the work to set quickly, so speed in application of the wash to the hessian is necessary.

The following hints on the making of good concrete will prove invaluable to the handyman:—

1. Aggregates must be clean and sound. Obtain them from a reliable source.

2. Water from a town supply is usually satisfactory. Stagnant water may not be. If doubtful, have tests made.

3. If organic matter is present in sand it will be harmful to concrete. A useful test for sand which shows whether organic material is present is to pour a handful to a height of about 2 inches in a bottle or glass jar. Make a 3 per cent. solution of caustic soda, and pour enough of this into the jar until the solution is 2 inches above the level of the sand. Shake the mixture and allow to stand for 24 hours. If the resulting solution is paler in colour than whisky, the sand is satisfactory. If the solution is darker, organic material is present and the sand should be submitted to physical tests and chemical analysis.

4. Quantities of all aggregates should be carefully gauged by volume. The best measure is 1 cubic foot because the paper bag (94 lbs.) of cement contains 1 cubic foot.

5. Measure the quantity of mixing water to make the concrete fairly stiff, and then use a similar quantity for each succeeding batch. For a 1:2½:4 mixture the total quantity of water should not be more than 5 or 6 gallons per paper bag of cement. Extra mixing water reduces the strength of concrete; stiff mixtures are the strongest; sloppy mixes are the weakest.

6. For ordinary purposes a good concrete mixture consists of: 1 cubic foot (94 lbs., paper bag) of cement; 2½ cubic feet of clean sand; 4 cubic feet of screenings or gravel free from clay. This is six and a half parts of separate aggregates to one of cement. In unimportant structures leaner mixtures may be employed, but as a general rule do not attempt mixtures of more than eight parts of separate aggregates to one of cement.

7. When using a mixing machine, mix concrete for 2 minutes after all materials have been placed in the drum. Put the water into the mixer first, as this cleans up the drum, prevents concrete from setting at the back of the blades, and gives a better mix.

8. For mixing by hand, work on a clean, smooth, watertight floor. Use square-mouth shovels. Spread the measured quantity of screenings or gravel to an even thickness of 3 inches or 4 inches. Over this spread the measured quantity of sand and then the cement. Turn these materials over three times, making one distinct heap of the full batch each time. Make a good hollow in the top of the heap and gently pour in the measured quantity of water. Shovel the dry materials into the water and then turn over the entire batch at least three times as before, until the concrete is well mixed.

9. When placing concrete, pack it well into place with rammers of timber or steel to exhaust air and give dense concrete without porous patches.

10. Within 24 hours of placing, cover all concrete with wet bags, earth, sand, or waterproof paper and keep wet for at least 7 days. This is called curing, and is of the greatest importance. It is well known that cured concrete reaches up to double the strength of uncured concrete.

11. We do not recommend the use of stone-dust as an aggregate for concrete. Far better results can be obtained with the use of clean sand.

LIST OF MIXES WITH TABLES OF QUANTITIES

Quantities of Materials Required to Make 10 Cubic Yards of Mixture

MIX.	USES.	Cement in bags	Sand c. yds.)	Coarse Aggregate (c. yds.)
1:3:5	Foundations and large masses of concrete; Heavy walls, buttresses and counter weights	4[illegible]	5.2	8.7
1:2½:4	General concrete around farm and home; Floors, posts, tennis courts, troughs and silos	[illegible]	5.3	8.4
1:2:4	Specification concrete (city building regulations): Beams, slabs and fireproofing steelwork		4.5	8.9
1:2¼:3½	Water tanks, towers, wells, lining shafts, tunnels, large drainage pipes	[illegible]	5.4	8.3
1:2:3	High strength, structural, concrete, columns, girders, pipes, marine works, piles	[illegible]	5.4	8.0
1:1:3	Heavy duty floors for factories and dairies. Finish by trowelling. Aggregates exposed at surface	[illegible]	[illegible]	[illegible]
1:-:2½	Terazzo walls and floors. Marble chips used for aggregates. No sand. Finished by grinding	[illegible]	—	[illegible]
1:2½:-	Surface layer for paths, drives and tennis courts. Grout for cement penetration paths. Glass brick laying	[illegible]	[illegible]	—
1:3:-	Wall plaster, ornaments for sand-stone texture. Rough cast and stucco. Small pipes for drains	[illegible]	[illegible]	—
1:4:-	Mortar for laying cavity brick wall and ashlar stone work. Add 1/5 to ¼ part hydrated lime	[illegible]	[illegible]	—
1:5:-	Building blocks and bricks. Semi-dry cement-sand mixtures. Will not resist dampness. Require waterproof finish	[illegible]	[illegible]	—

Chapter VI.

HOW TO DO IT

THE main job of this chapter is to explain how to do many of the little jobs around the home. There is a two-fold purpose in this chapter:

(1) It is exceedingly difficult, if not impossible, to secure any form of labour under the present conditions.

(2) By doing these jobs oneself, you definitely accumulate knowledge which must stand one in good stead on more than one occasion. Therefore, we not only learn, but definitely economise while learning. Naturally, however many books we write, there will always be some subject untouched, and for those readers who desire information on something not contained herein, the editor invites their enquiries.

We introduce the chapter with letter numbers and illustration of the new tap washers. The washers themselves, although of leather, can still be purchased, but if, however, the handyman finds himself out of stock, it is a simple matter to cut such washers with a sharpe knife to fit the tap jumper. It should be noted that these washers can be purchased in rubber composition, but the writer inclines to the idea that genuine leather is to be preferred. The following illustrations and matter give a clear insight into this simple operation.

FITTING NEW WINDOW CORDS

This comparatively simple job is one which is often neglected through lack of knowledge. Actually, it is not difficult. Proceed as follows: Round the flat sides of all window frames will be seen a flat ROUND touched beading. It is obvious that this beading keeps the SASHES in place. It is necessary to remove the top beadings so that you can lift out the sash. On either side of the latter is a deep groove, nailed to which is a length of cord. Each cord runs over a pulley set in the top of the window frame. Naturally the side which has the broken cord will pull right out from the pulley. Now you have to reach the sash weight, which will have dropped to the bottom of the whole frame. Note carefully that on the flat inner side of the frame under the pulleys is a piece of wood fastened with screws. This is just a casing over the whole frame. Remove screws and carefully take off this thin wooden slat. It should now be possible to reach in and lift up the sash weight. Such weights are heavy and of solid cast iron, round in shape and holed so that you can attach cord to one end. For the reader's further information, it may be pointed out that sash weights are sold by weight. For instance, if a glazed sash weighs 12 lbs., it will be fitted with two 6-lb.

weights. Thus can be seen a counter balance in weight for the sash. This is the reason why occasionally one strikes a window which will persist in running up. Probably it is fitted with sash weights a pound or two too heavy. The exact counter-balance is all that is needed.

When you have removed sash weight, take off the old cord where it is nailed in the sash groove. At the same time, measure the cord. When you are satisfied that your measurement is correct, cut new cord and nail one end in the groove provided in the sash and then thread through the end pulley. After that you can also thread it through sash weight and tie one knot to prevent its withdrawal from the weight. Next place the latter back in the window frame and allow sash to fit into its proper place (if replacing the piece that covers wood under the pulleys). The final operation is to replace round each beading.

Note Carefully.—Unless you have a stretched sash cord, it is wise to allow the length of the latter about 2 inches shorter than is actually needed. This is to allow weight to stretch cord without the weight itself grounding at the bottom of the sash frame.

RE-PUTTYING WINDOWS

Weather stress and other causes often result in the grazing putty falling out or cracking and so becoming inefficient. Rain may penetrate, the glass will rattle and the whole set-up becomes generally out of hand. The best plan is to remove all the putty where necessary. This is done (if you have it) with what is termed a hacking knife. This is a broad-bladed, fairly long-length knife, thick on the top edge running down wedged-shape to a fairly fine blade. If, however, you do not possess this tool, an old chisel or even a strong pen knife will suffice.

Remove all very fine putty, and endeavour to introduce the extreme end of the knife under the putty and tap out with hammer. For very hard putty, as is made within lead sashes, which must be removed after the glass breaks, it is almost essential to have a hacking knife. When all old putty is removed, give the sash a coat of priming paint, at the same time brading in the glass. This removes a great deal of strain from the putty. When priming is dry, re-putty sash, smoothing off with putty knife.

THE USE OF PLASTIC WOOD AND COLD WATER PUTTY

Both these materials can be used as fillers for many kinds of jobs. For filling in thin, hair-line cracks in timber, nail holes, or similar blemishes in the timber work they are invaluable. There are two important points to remember:

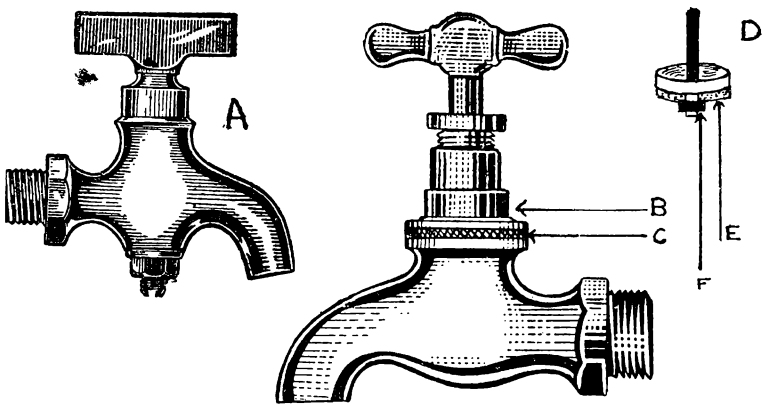
(1) Plastic wood is in paste form, is hard to stain to match certain coloured timbers, and has a tendency to shrink slightly. This fact should be kept in mind when deciding on its use.

(2) Cold water putty is supplied in powder form. One of the greatest advantages in this is the fact that it can be stained with any colour pigment, in powder form, and, in addition, will mix with methylated spirits or oil. Thus, it is ideal as a filler, and very little shrinkage, if any, will take place.

Plastic wood is supplied in tubes and emerges like tooth paste, whereas cold water putty is sold in tins as a powder. The various advantages for both these fillers is obvious.

HOW TO FIT A NEW WASHER TO A HIGH PRESSURE TAP

The illustrations show two taps. "A" is a low pressure tap; it is to be found on tanks or similar containers where the PRESSURE is not HIGH. Thus it is a simple tap with a single turn top.



The other tap is the standard HIGH pressure tap, such as all buildings are equipped with. Note that its various parts are SCREWED and made to fit by screwing down, one part into another. This is in order that the tap may be fitted with a "JUMPER." This jumper is really a valve which, as you turn ON the tap handle, is allowed to RISE and let the water through. The turning of the handle CLOCKWISE closes the "valve" or, in other words allows the jumper to sit down tight on its bed, which is the lower portion of the main body of the tap, thus shutting off the water. To make this "valve" principle operative, the jumper is fitted with a leather washer. The illustration "D" shows the jumper. It is just with a little brass spinning top. "E" is the leather washer, and "F" the small nut which screws off to allow you to fit a new washer.

Possibly you may find the nut missing; if so, do not worry, the washer will fit so tightly that the nut CAN be done without if necessary.

To fit your new washer, first turn off water at the main stop cock or tap. IF YOU CAN'T FIND THIS MAIN TAP, turn on all the taps you can and so relieve the pressure. Next take a square-jawed wrench or spanner, which will fit the portion marked "B." This is a hexagon nut and keeps the top section of the tap in place.

When this is unscrewed you can remove the section and will see the jumper sitting in its place at the base of the inside of the tap; it can be lifted out quite easily. Next remove the nut "B," refit a new washer, and replace all parts. See that the HANDLE PART of the tap is unscrewed as though you were letting the water through before you screw down the nut "B" again.

"C" shows the leather washer forming a SEAL and BED for the top section of the tap.

NOTE.—It is NOT advisable to use the method of turning on all taps to relieve the pressure; it is waste of water and much to be deprecated, and also a wet job into the bargain. If, however, you just can't find the main stop cock, you may have no option but to act in that manner.

A NEW "DOMUS" DEPARTMENT

OVER the past six years "DOMUS," in his lectures from the Australian Broadcasting Commission, has dealt with every branch of Building and Reconstruction Work.

In addition, hundreds of lectures have been given on subjects of intense interest to the Handyman, from French Polishing to Concrete Work.

This has resulted in many thousands of enquiries for printed matter and for information of a more technical nature than can be given during Broadcasts.

Thus the "Domus" Publishing Coy. was formed to provide books and articles on every form of craftsmanship.

Now a further service is to be provided — a BUREAU OF INFORMATION.

This Bureau will supply EVERY SORT of information relative to home constructional work, the upkeep of the home, workshop practice, and what is most important, instructions to those people who are keen and competent handymen, but who desire additional knowledge.

Special attention will be given to women, who have much responsibility in the maintenance of the home during the absence of their menfolk. Thus a complete service will be provided for the use of members of the Bureau.

It is impossible to provide such service free of cost, but the matter of fees has been given special consideration, and the amount decided upon is so small that it will be within the reach of all. It will, in addition, more than return its outlay in information available throughout the year.

This fee has been fixed at 10/6.

Members are entitled to the following service:—

(1) Advice on any matter relative to building or constructional work.

(2) Information on all matters relative to such subjects as Concreting, Brickwork, Masonry, Painting, Carpentry, Joinery and Furniture Construction.

(3) Inspection of any property on which work is needed and advice required. In such cases travelling expenses are charged, and where the visit entails too long a period a small cost for time.

(4) Members may, if necessary, call by appointment at the Melbourne office for personal information.

(5) Provision has been made to supply members with market information on goods they require. If there are certain paints or other lines wanted, the Bureau will tell you whether these are obtainable and,

in all cases, when requested, the goods will be ordered and forwarded to the member upon their written authority to obtain them. NO EXTRA COST ABOVE THE RETAIL PRICE WILL BE CHARGED.

(6) Members will also receive full advice on the various methods of home purchase. Now this includes the direct purchase of ready built properties, the purchase of blocks of land, or advice on how to obtain (if possible) the property they are renting and in which they are living.

In addition to the foregoing a Technical Library is to be installed which, when complete, will be at the disposal of the members. At present the difficulty of obtaining books precludes the installation of this service.

To become a member of the "DOMUS BUREAU OF INFORMATION fill in the following details and return to the address given:—

The Manager,

"DOMUS" BUREAU OF INFORMATION,

3rd Floor, 100 Queen Street,

MELBOURNE. BOX 2323V.

Dear Sir,

I desire to become a member of your Bureau of Information. I enclose the sum of..... which is to be the full annual cost of any information I may require other than plans of a special nature or materials not included in the foregoing offer.

Name.....

Address.....

Date.....

Purchasing of Materials

The Reader's attention is directed to the various advertisements appearing from time to time in "Domus" books.

All such advertisements are accepted only from firms and services of unimpeachable integrity, and in the sure knowledge that in purchasing advertised goods, buyers will receive the highest quality at the lowest cost consistent with that quality.

"Domus"